National Research Council Canada
Conseil national de recherches Canada

NRC RESEARCH ACTIVITIES DIRECTORY

LIMITED DISTRIBUTION

Canada

OCTOBER, 1983

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*Not described in current issue of the Directory

FOREWORD

This Directory is designed to improve existing NRC-industry interface by making available (to industry as well as universities and government organizations) an inventory of NRC research activities and points of contact for enquiries.

In the first part of this Directory, research activities within each division are compiled by section. The Director and principal researchers are listed, together with their special field of expertise and telephone numbers. Also included are maps indicating the location of each division.

NRC's two new laboratories, the Biotechnology Research Institute in Montreal and the Institute for Manufacturing Technology in Winnipeg will be fully operational by 1986. (They are not described in this issue of the NRC Research Activities Directory).

In the INDEX of this Directory, research activities within NRC laboratories (in keyword format) are listed in alphabetical order. A short description of the work, where it is done, a point of contact and telephone number are provided after each entry. A listing of NRC's Facilities and Services is provided separately in Part II of the INDEX.

THE NATIONAL RESEARCH COUNCIL OF CANADA

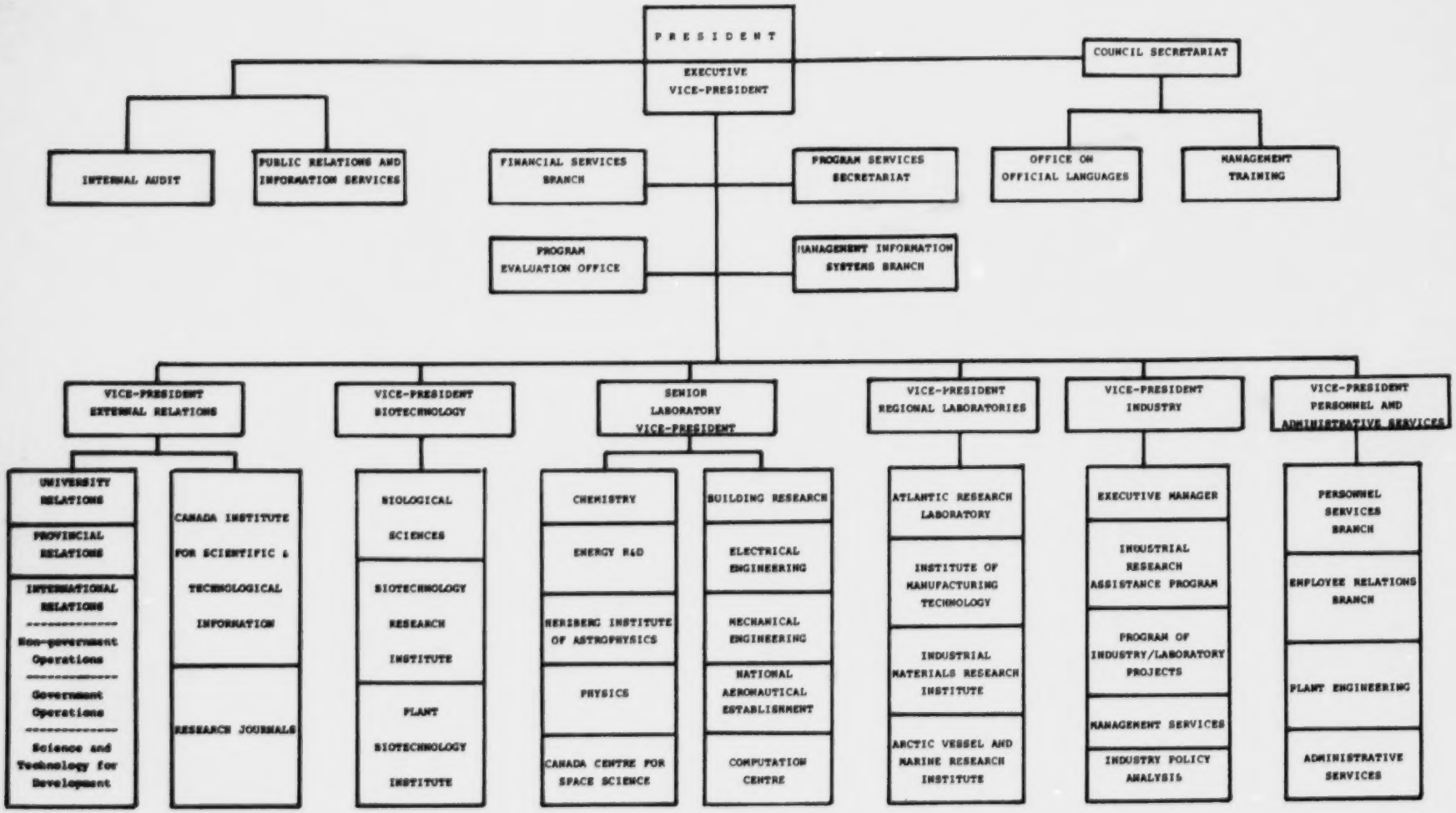
The National Research Council is the federal government's largest and most diversified research organization. It plays a major role in developing new knowledge and in applying science and technology to further the government's priority goals for the economic and regional development of Canada.

The Council's responsibilities include operating more than a dozen research divisions, running major national facilities for both science and engineering, managing industrial development programs, and providing a national network for scientific and technical information.

NRC is a responsive organization whose strength lies in its scientists and engineers who deliver their expertise in diverse fields when and where it is needed. All elements mesh together to build science and technology in Canada for both short and long-term needs, and to develop and maintain a knowledge base for the country's present and future endeavors.

NRC has a central base in the National Capital Regional and existing installations from Victoria, B.C., to St. John's, Nfld. In addition, two new laboratories have been announced, the Biotechnology Research Institute in Montreal and the Institute for Manufacturing Technology in Winnipeg, both of which will be fully operational by 1986.

NATIONAL RESEARCH COUNCIL OF CANADA



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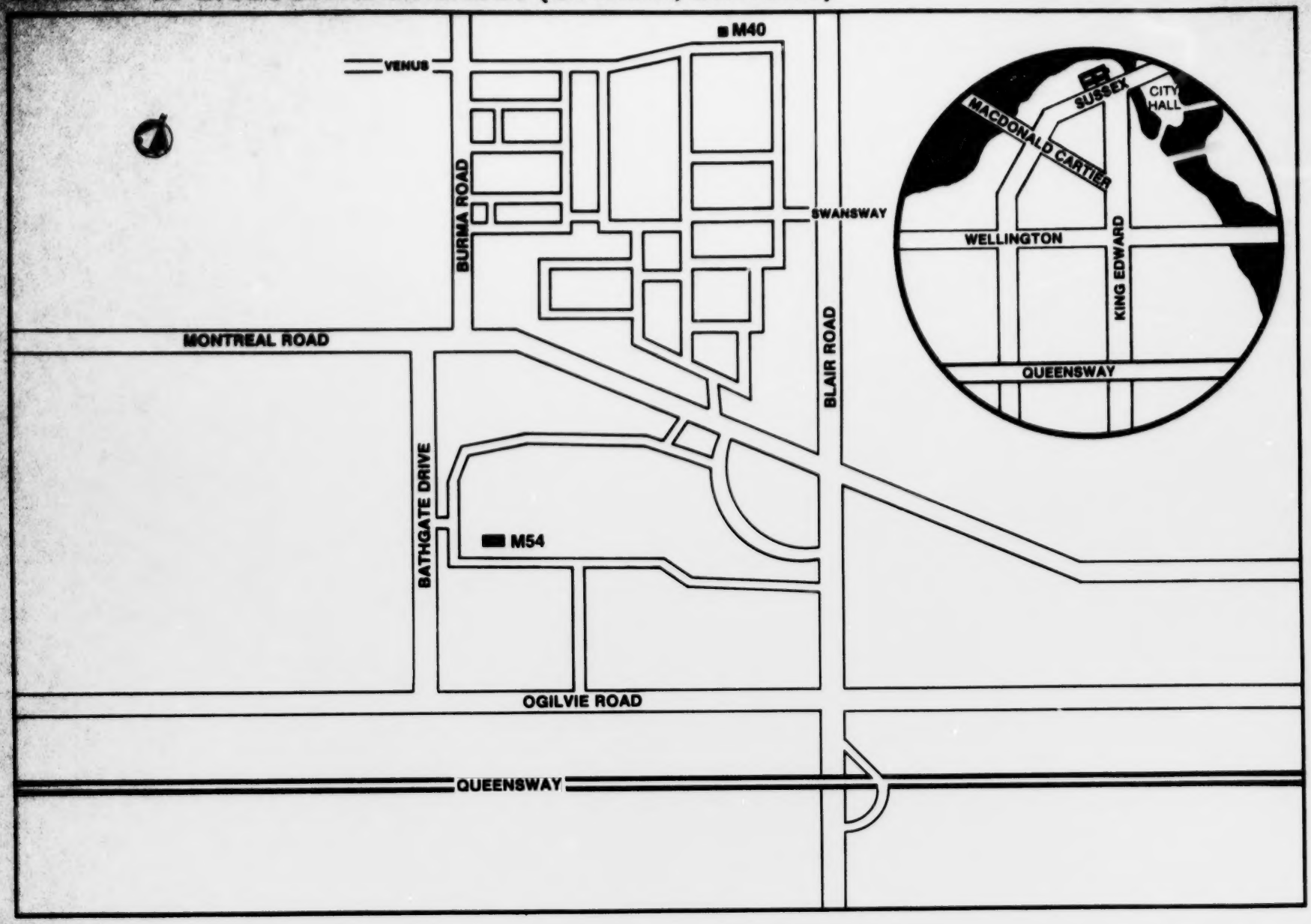
Administrative Organization

EXECUTIVE OFFICES

Address: Montreal Road, Ottawa, Ontario K1A 0R6

President	Dr. Larkin Kerwin	(613) 993-2024
Executive Vice-President	Mr. W.A. Cumming	(613) 993-9056
Vice-President (Industry)	Mr. K. Glegg	(613) 993-9186
Vice-President (Laboratories)	Mr. J.K. Pulfer	(613) 993-1992
Vice-President (Biotechnology)	Dr. M. Brossard	(613) 993-1200
Vice-President (Regional Laboratories)	Dr. R. Pottie	(613) 993-1265
Vice-President (External Relations)	Dr. B.A. Gingras	(613) 993-2022
Vice-President (Personnel and Administrative Services)	Mr. B.D. Leddy	(613) 993-9260
Secretary General	Mrs. M.M. Hinchey	(613) 993-9244

[illegible] OF BIOLOGICAL SCIENCES (OTTAWA, ONTARIO)



Division of Biological Sciences

DIRECTOR	Dr. C.T. Bishop	(613) 995-6600
ASSOCIATE DIRECTOR	Dr. F. Depocas	(613) 993-9316
ADMINISTRATIVE OFFICER	Dr. G.H.M. Adams	(613) 992-5501
SECTION HEADS		
Cell Physiology	J.F. Whitfield	(613) 993-9090
Animal Physiology	Dr. F. Depocas	(613) 993-9316
Environment	I. Hoffman	(613) 996-6810
Ecotoxicology	D.R. Miller	(613) 593-6912
Biomathematics	D.R. Miller	(613) 593-6912
Microbiology and Immunochemistry	M.B. Perry	(613) 992-8995
Biological Production of Fuels	L. van den Berg	(613) 992-3310
Molecular Genetics	V.L. Seligy	(613) 992-6055
Molecular Biophysics	I.C.P. Smith	(613) 995-7852
Cell Biophysics	J.R. Colvin	(613) 593-4712
X-Ray Crystallography	F.R. Ahmed	(613) 992-2525
Molecular Biochemistry	K.R. Lynn	(613) 992-1321

CELL PHYSIOLOGY

J.F. Whitfield
Telephone (613) 993-9090

- control systems in cell proliferation; the earliest steps in DNA synthesis in normal and in cancer cells; the role of calcium ion and cyclic AMP as controls

ANIMAL PHYSIOLOGY

F. Depocas
Telephone (613) 993-9316

- environmental effects on physiological systems: mechanism of acclimation to cold; structure and function of noradrenergic vesicles in sympathetic nerve endings of brown adipose tissue; blood flow regulation in brown adipose tissue; bioelectric phenomena.

ENVIRONMENT

I. Hoffman
Telephone (613) 996-6810

- this group responds to priorities established by the NRC Associate Committee on Scientific Criteria for Environmental Quality. The objective is to evaluate available information on effects of contaminants on receptors and publish reports based upon the best criteria.

ECOTOXICOLOGY

D.R. Miller
Telephone (613) 593-6912

- behaviour and toxicology of environmental contaminants, particularly heavy metals; mechanisms of toxicity at molecular level.

BIOMATHEMATICS

D.R. Miller
Telephone (613) 593-6912

- statistics, computation, design of experiments, computer modelling and simulation techniques.

MICROBIOLOGY AND IMMUNOCHEMISTRY

M.B. Perry
Telephone (613) 992-8995

- anaerobic microbiology, methanogenic bacteria, hydrogenases, continuous culture studies, enterotoxins, growth of pathogenic bacteria. Antigens of pathogenic bacteria, Neisseria species, chlamydia, pneumococcus, streptococcus; structure-function in polysaccharide antigens, use in vaccines and diagnostics; synthetic antigens; monoclonal antibody from hybridomas; immunoglobulins.

BIOLOGICAL PRODUCTION OF FUELS

L. van den Berg
Telephone (613) 992-3310

- biogas fermentation; practical production of biogas from sewage sludge and food wastes; preservation of fruits and vegetables by high-humidity refrigerated storage.

MOLECULAR GENETICS

V.L. Seligy
Telephone (613) 992-6055

- cloning of genes in yeast and bacteria; transformation of yeast; studies on gene expression; synthesis of genes and of linker segments for plasmid linking; structure of chromatin; restriction enzymes; ribosome structure.

MOLECULAR BIOPHYSICS AND BIOCHEMISTRY

I.C.P. Smith
Telephone (613) 995-7852

- use of nuclear magnetic resonance and electron spin resonance to study structure-function relations in biological systems; the dynamics of biological membranes; definition of receptor sites.

CELL BIOPHYSICS

J.R. Colvin
Telephone (613) 593-4712

- biosynthesis of cellulose; fibrogenesis in cells; electron microscopy.

X-RAY CRYSTALLOGRAPHY

F.R. Ahmed
Telephone (613) 992-2525

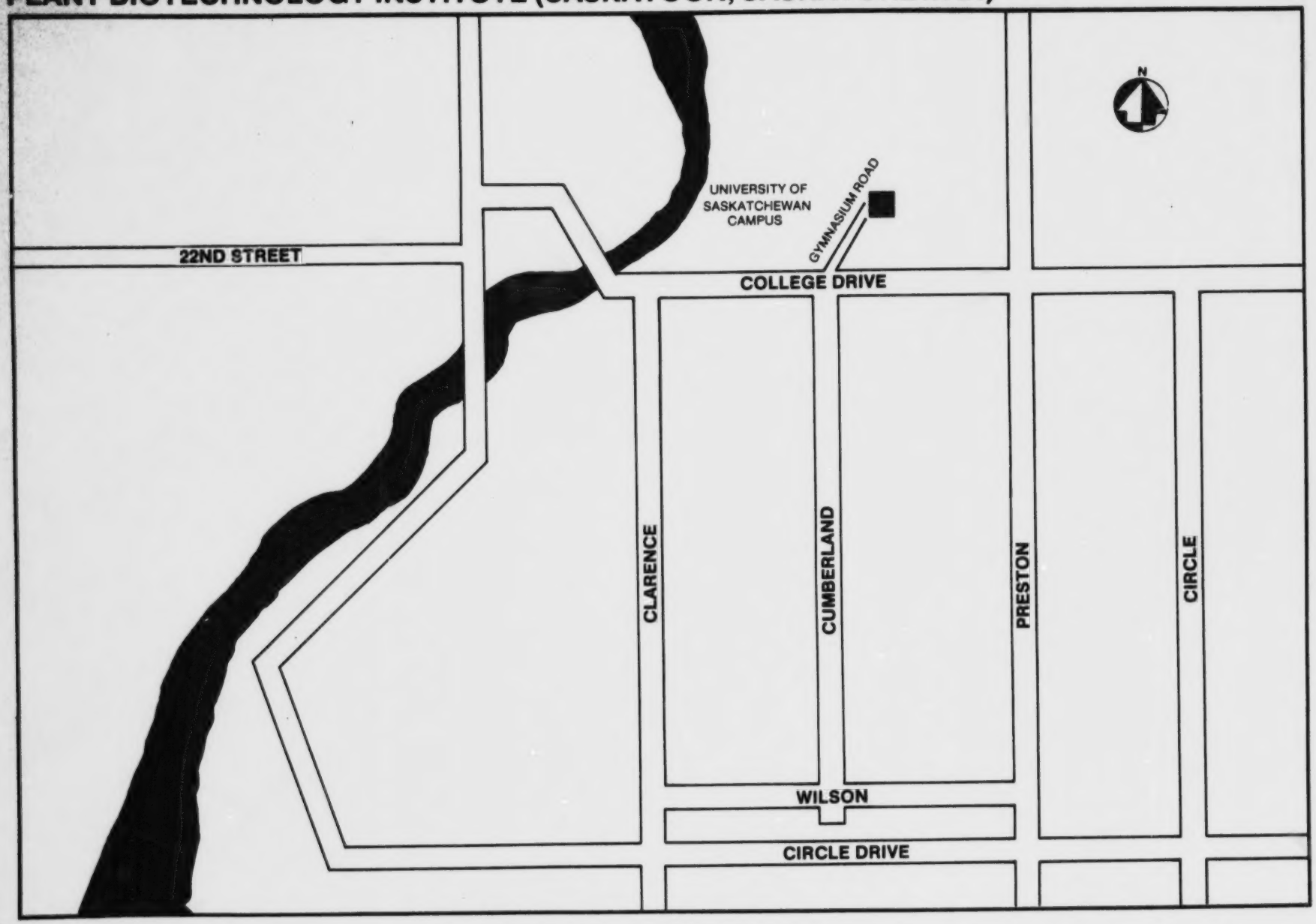
- crystal structures of compounds of biological interest, nucleotides, pharmaceuticals; correlation of structure with biological activity.

MOLECULAR BIOCHEMISTRY

K.R. Lynn
Telephone (613) 992-1321

- protein biochemistry; isolation and characterization of enzymes, hydrogenases, protein kinases, sulfatases; studies of enzyme-substrate reactions by laser Raman spectroscopy and fluorescence spectroscopy.

PLANT BIOTECHNOLOGY INSTITUTE (SASKATOON, SASKATCHEWAN)



Plant Biotechnology Institute

DIRECTOR	Dr. W.F. Steck	(306) 665-4191
ADMINISTRATIVE OFFICER	J. Yorke	(306) 665-4191
SECTION HEADS		
Plant Biochemistry	Dr. F. Constabel	(306) 665-5281
Microbial Physiology and Biochemistry	Dr. J.C. MacDonald	(306) 665-5244
Biotechnology	Dr. W.G.W. Kurz	(306) 665-5278
Chemistry of Natural Products	Dr. A.P. Tulloch	(306) 665-5258

PLANT BIOCHEMISTRY

Dr. F. Constabel
Telephone (306) 665-5281

The section conducts research on plant cells in culture - their manipulation, propagation, storage, hybridization, physiology, metabolism and genetic modification.

MICROBIAL PHYSIOLOGY AND BIOCHEMISTRY

Dr. J.C. MacDonald
Telephone (306) 665-5244

The section conducts research in nitrogen fixation, microbial metabolism, microbiology and fermentation methodology.

BIOTECHNOLOGY

Dr. W.G.W. Kurz
Telephone (306) 665-5278

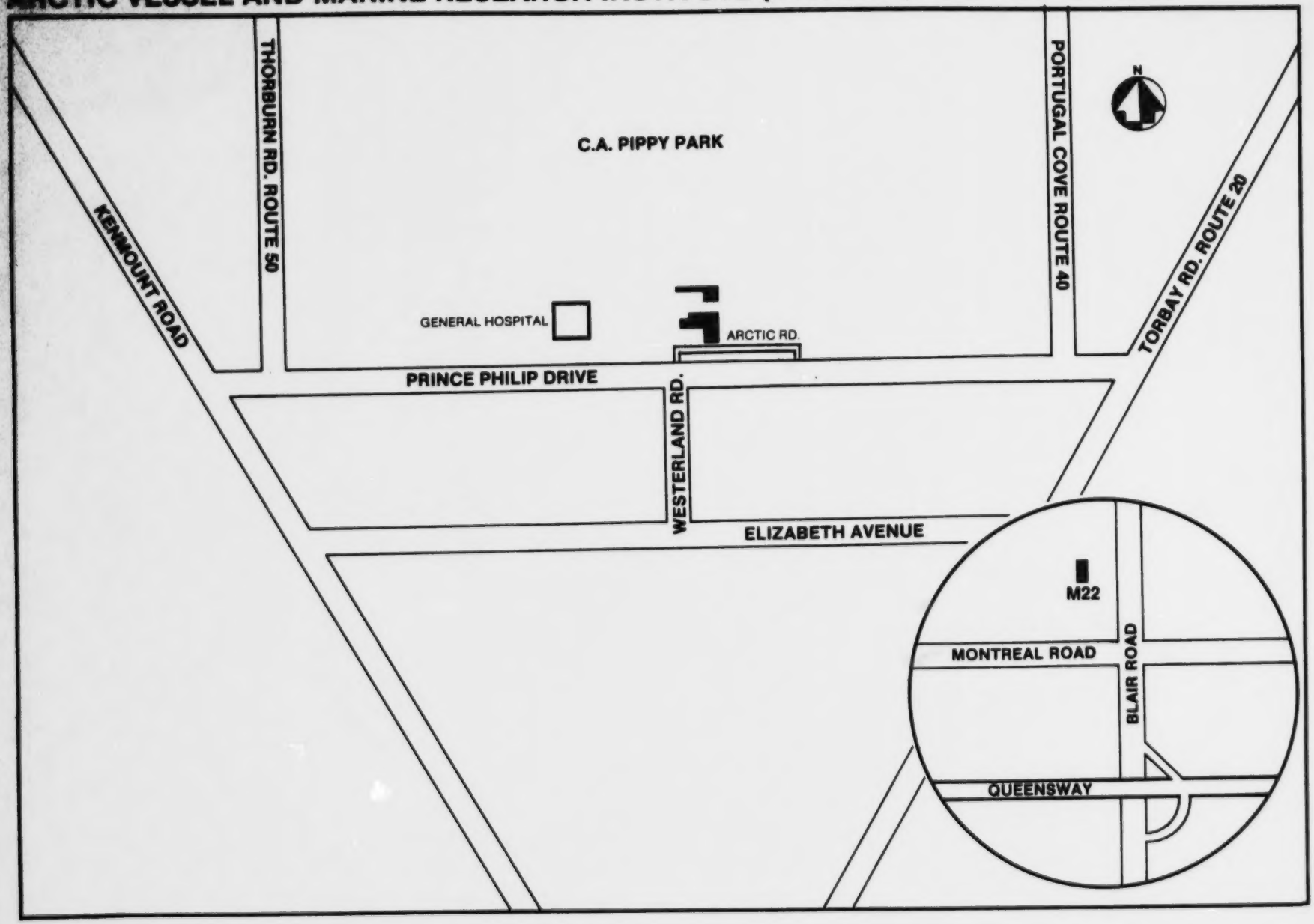
The section conducts research in production processes for cell alkaloids and enzymes, in plant utilization and in fermentation technology.

CHEMISTRY OF NATURAL PRODUCTS

Dr. A.P. Tulloch
Telephone (306) 665-5258

The section conducts research in synthesis and analysis of organic compounds and in chemical ecology of plants and insects.

ARCTIC VESSEL AND MARINE RESEARCH INSTITUTE (ST. JOHN, NEWFOUNDLAND)



Arctic Vessel and Marine Research Institute

DIRECTOR	N.E. Jeffrey	(613) 993-2265
ASSISTANT DIRECTOR	L.I. Kawerninski	(613) 993-2288
SECTION HEADS		
Research Program	M. Michailidis	(613) 993-2288
Operational Group	D. Murdey	(613) 993-2288
Systems Development Group	D. Gospodnetic	(613) 993-2288

RESEARCH PROJECTS SECTION

Mr. M. Michailidis
Telephone (613) 993-2288

- Model and full scale studies of ocean waves and response motions and seakeeping qualities of marine vehicles
- Model and full scale studies of vessels operating in ice-covered waters, their interaction with ice and their icebreaking qualities
- Model studies of ocean platforms, their towing characteristics, responses and stability in wind and waves and interaction with ice
- Full scale measurement of ice properties and study of ice conditions and behaviour
- Mathematical and physical modelling of the Arctic environment and its effect on marine vehicles and structures
- Development of synthetic ice and scaling of ice properties for use in model studies
- Studies of moored structures
- Restricted waterways and shallow water effects
- Cable fairings
- Fishing vessel design and seakeeping studies

OPERATIONS SECTION

Mr. D.C. Murdey
Telephone (613) 993-2288

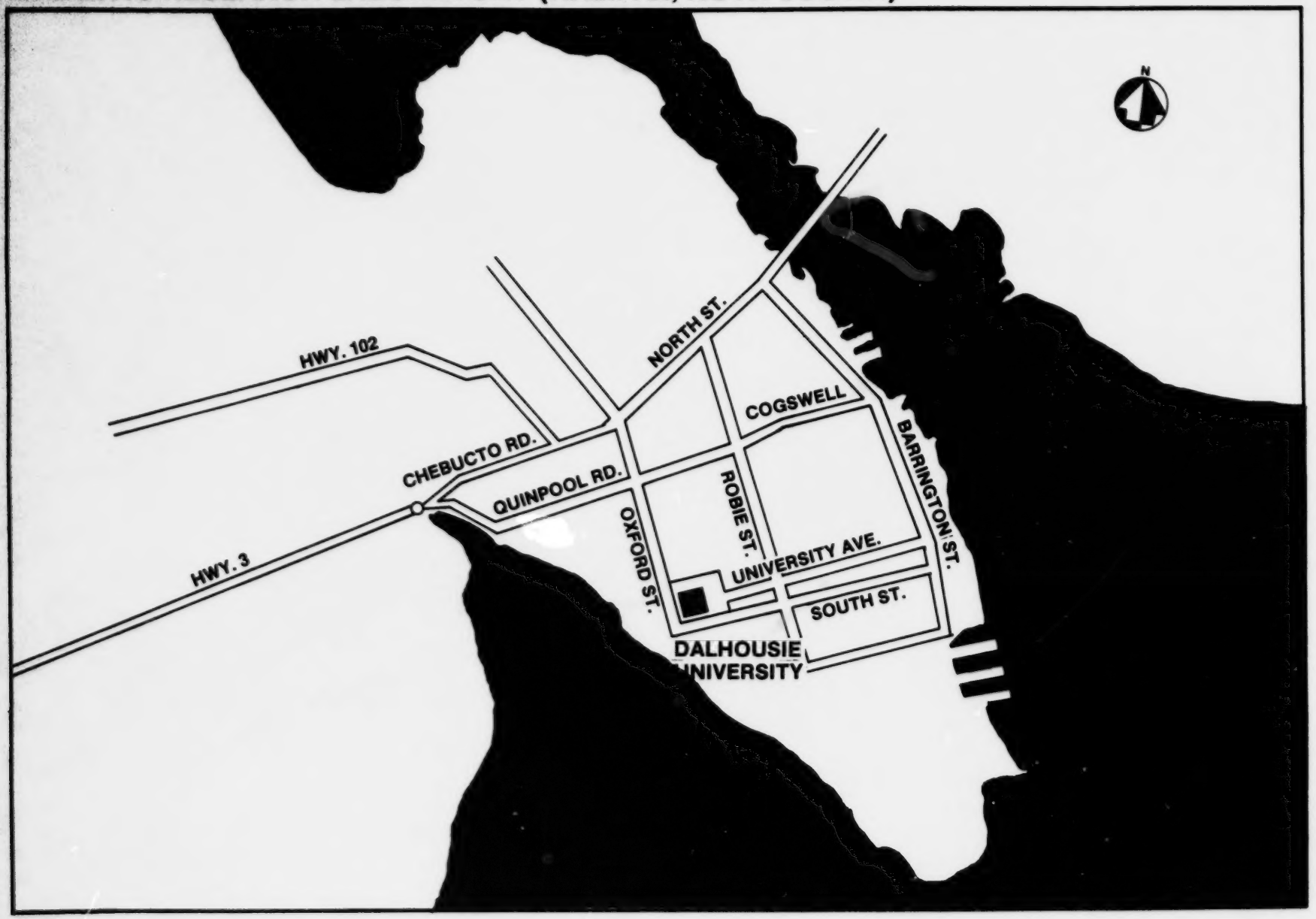
- General ship and propeller hydromechanics and hull form design
- Manufacture of models of ships or other marine vehicles, their appendages and propellers for testing in AVMRI facilities
- Investigations of model resistance, propulsion, maneuvering and seakeeping characteristics
- Flow studies and wake surveys
- Full scale speed, power, maneuvering and seakeeping trials

SYSTEMS SECTION

Dr. D. Gospodnetic
Telephone (613) 993-2288

- Mathematical modelling of hydrodynamic phenomena
- Development of computer-aided design and manufacture of ship and propeller models
- Design and development of systems and techniques for data acquisition and control of model tests of ships and other marine vehicles in clear water and ice environments
- Development of software for analysis of model tests and full scale trials and prediction of ship performance

ATLANTIC RESEARCH LABORATORY (HALIFAX, NOVA SCOTIA)



Atlantic Research Laboratory

DIRECTOR	Dr. F.J. Simpson	(902) 426-8278
ASSISTANT DIRECTOR	D.R. Robson	(902) 426-8271
EXECUTIVE ASSISTANT	Mrs. Hilchie	(902) 426-8272
SECTION HEADS		
Analytical Chemistry	Dr. W.D. Jamieson	(902) 426-8279
Biophysics	Dr. M. Falk	(902) 426-8265
Chemistry of Natural Products	Dr. A.G. McInnes	(902) 426-8262
High Temperature Chemistry	Dr. C.R. Masson Dr. S.G. Whiteway	(902) 426-8267 (902) 426-8269
Electron Microscopy	Dr. A.W. Hanson	(902) 426-8258
Instrumentation	F.G. Mason	(902) 426-8254
Lichenology	Dr. W.S.G. Maass	(902) 426-8286
Marine Plants		
Botany	Dr. J.L. McLachlan	(902) 426-8274
Biochemistry	Dr. J.S. Craigie	(902) 426-8287
Chemistry	Dr. J.L.C. Wright	(902) 426-8275
Genetics	Dr. J.P. Van der Meer	(902) 426-8276
Seaweed Culture Station	P.F. Shacklock	(902) 868-2232
Microbiology	Dr. A. Taylor	(902) 426-8289
National Peat Program	Dr. T.E. Tibbitts	(902) 426-7532

ANALYTICAL CHEMISTRY

Dr. W.D. Jamieson
Telephone (902) 426-8279

- development of methods for analysis of materials with high salt concentrations: mass spectrometry, plasma emission and atomic absorption, chemical standards.

BIOPHYSICS

Dr. M. Falk
Telephone (902) 426-8265

- infrared spectrophotometry - development of analytical techniques and procedures.

CHEMISTRY OF NATURAL PRODUCTS

Dr. A.G.McInnes
Telephone (902) 426-8262

- nuclear magnetic resonance spectrometry - physical and chemical instrumentational analyses on the structure of organic molecules.

HIGH TEMPERATURE CHEMISTRY

Dr. C.R. Masson
Telephone (902) 426-8267

- ionic structure of metallurgical slags, gaseous transport in molten ores, effect of electrons on diffusion of sulphur and oxygen.

Dr. S.G. Whiteway
Telephone (902) 426-8269

- studies on beneficiation; pyrolysis of coal and peat, use of coal-liquid slurries.

ELECTRON MICROSCOPY

Dr. A.W. Hanson
Telephone (902) 426-8258

- physical analysis: scanning electron microscope, electron microprobe, X-ray crystallography.

INSTRUMENTATION

Dr. F.G. Mason
Telephone (902) 426-8254

- development of analytical instruments - repairs to major instrumentation.

LICHENOLOGY

Dr. W.S.G. Maass
Telephone (902) 426-8286

- ecology and chemistry of lichens and sphagnum mosses.

MARINE PLANTS
BOTANY

Dr. J.L. McLachlan
Telephone (902) 426-8274

- ecology and taxonomy of marine plants.

MARINE PLANTS
BIOCHEMISTRY

Dr. J.S.Craigie
Telephone (902) 426-8287

- biochemistry of marine plants, development of aquaculture systems.

MARINE PLANTS
CHEMISTRY

Dr. J.L.C. Wright
Telephone (902) 426-8275

- isolation of biologically-active compounds form marine organisms.

MARINE PLANTS
GENETICS

Dr. J.P. Van der Meer
Telephone (902) 426-8276

- genetic studies on marine algae.

MARINE PLANTS
SEAWEED CULTURE STATION

Dr. P.F. Shacklock
Telephone (902) 868-2232

- development of aquaculture systems.

MICROBIOLOGY

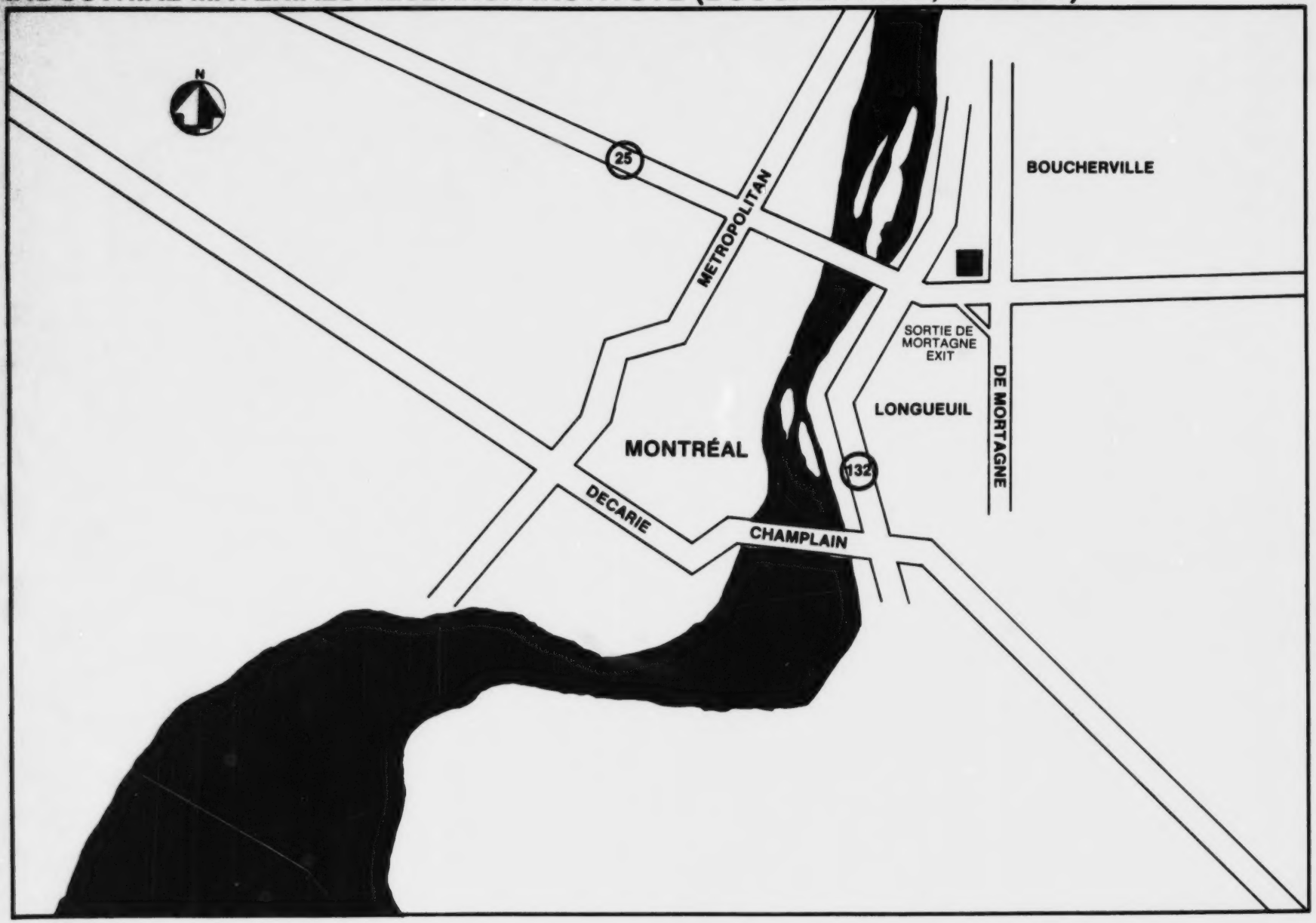
Dr. A. Taylor
Telephone (902) 426-8289

- effect of fungal toxins on growth of ruminants.

NATIONAL PEAT PROGRAM

Dr. T.E. Tibbitts
Telephone (902) 426-7532

INDUSTRIAL MATERIALS RESEARCH INSTITUTE (BOUCHERVILLE, QUÉBEC)



Industrial Materials Research Institute

DIRECTOR	G.L. Bata	(514) 641-2280
ADMINISTRATIVE OFFICER	P. Désy	(514) 641-2280
PROGRAMS		
Metals	Dr. A.H. Marquis	(514) 641-2280
Polymers	J. Prinsen	(514) 641-2280
SECTION HEADS		
Joining (welding)	Dr. G. Bégin	(514) 641-2280
Chemistry	Dr. J.-J. Hechler	(514) 641-2280
Mechanical testing	Dr. J. Masounave	(514) 641-2280
Nondestructive evaluation and Systems	Dr. J. Bussière	(514) 641-2280
Polymer processing	Dr. R. Gauvin	(514) 641-2280
Coatings and ceramics	Dr. S. Dallaire	(514) 652-9836
Rheology and characterization of plastics	Dr. L.A. Utracki	(514) 641-2280

JOINING (ARC WELDING)

Dr. Ghislain Bégin
Tel. (514) 641-2280

- Real-time control of arc welding procedures

  Using:
  - Infrared observations
  - Visible-spectrum photogrammetry
  - Acoustic signature of the arc

- CAD/CAM approach to robot welding
  - Offline programming
  - Adaptive technique

- Development of coating techniques (hard facing)

CHEMISTRY - CORROSION

Dr. Jean-Jacques Hechler
Tel. (514) 641-2280

- Chemical analyses and physicochemical properties of materials as determined by spectroscopy (IR, UV, visible, Raman), thermal analysis (thermogravimetry, differential calorimetry, differential thermal analysis), liquid and gas chromatography, atomic absorption.

- Studies of the effect of composition and structure on the general properties of materials (resistance to decay, mechanical and physical properties).

- Studies of the atmospheric corrosion of metals (measurement techniques), study and design of instruments, corrosion mechanisms, etc.

- Corrosive attack, decay and protection of materials at high temperatures.

- Specific studies (corrosion of gas cylinders, stress corrosion in a caustic-soda environment, etc.).

MECHANICAL TESTING

Dr. Jacques Masounave
Tel. (514) 935-8513

- Materials fatigue: measurement of basic properties for behaviour forecasting (random cycle fatigue, creep fatigue, weld fracture processes, endurance, nonpropagation threshold).

- Fatigue of structures: measurement of properties under service conditions (corrosion fatigue, biaxial fatigue).

- Development of new materials and improvement of existing processes (metallic composites, continuous casting, rheocasting, stress-relief annealing).

- Wear measurement and accuracy under severe and average conditions (limit state wear of bearings, fatigue-fretting).

- Characterization and measurement of standard material properties (Charpy, tensile, hardness, etc.) and microscopic analysis (microprobes, scanning electron microscopy).

NONDESTRUCTIVE EVALUATION AND SYSTEMS

Dr. Jean Bussière
Tel. (514) 641-2280

- Measurement of mechanical and viscoelastic properties of superconducting composites at various temperatures (Young's modulus, measurement of internal friction).

- Ultrasonic characterization of materials (plastics, metals using various methods: acoustic microscopes, analyses of acoustic spectra for flaw detection, phased arrays of ultrasonic transducers for electronic scans of ultrasonic beams).

- Development of optoacoustic and acoustothermal techniques of materials testing: ultrasonic wave generation using pulsed lasers, thermographic measurement of ultrasound absorption.

- Optical and thermographic inspection of materials: holographic interferometry, analysis of the light backscattered by a surface; thermal modelling of thin coatings and welding solutions.

- Computerized design and manufacturing systems.

POLYMER PROCESSING

Dr. Raymond Gauvin
Tel. (514) 641-2280

- Development of CAD/CAM techniques used in thermoplastic processing (basically injection moulding).
- Performance characteristics of thermoplastics and thermosets, including fatigue, toughness, mechanical strength, creep, abrasive wear and aging.
- Thermoset processing, e.g. by means of reaction injection moulding (RIM), resin transfer moulding (RTM) and compression moulding.
- Thermoplastic processing (large and small scale), using injection moulding, extrusion, single and double screws, thermoforming, compounding, compression moulding, etc.

COATINGS

Dr. Serge Dallaire
Tel. (514) 652-9836

- Development of two main coating procedures: plasma deposition (Mach II deposition, automatic device) and continuous coating (pilot project).
- Development of new powder materials for coatings, and their properties (atomizer-dryer, particle analyzer, air classifier, etc.).
- Studies of adhesion mechanisms of coatings (adhesion measurement device) and development of characterization and performance assessment techniques (e.g. thermal shock tests using electron guns).
- Research, development and assessment of new coating techniques and surface treatments (e.g. using lasers).

RHEOLOGY AND CHARACTERIZATION OF PLASTICS

Dr. Leszek A. Utracki
Tel. (514) 641-2280

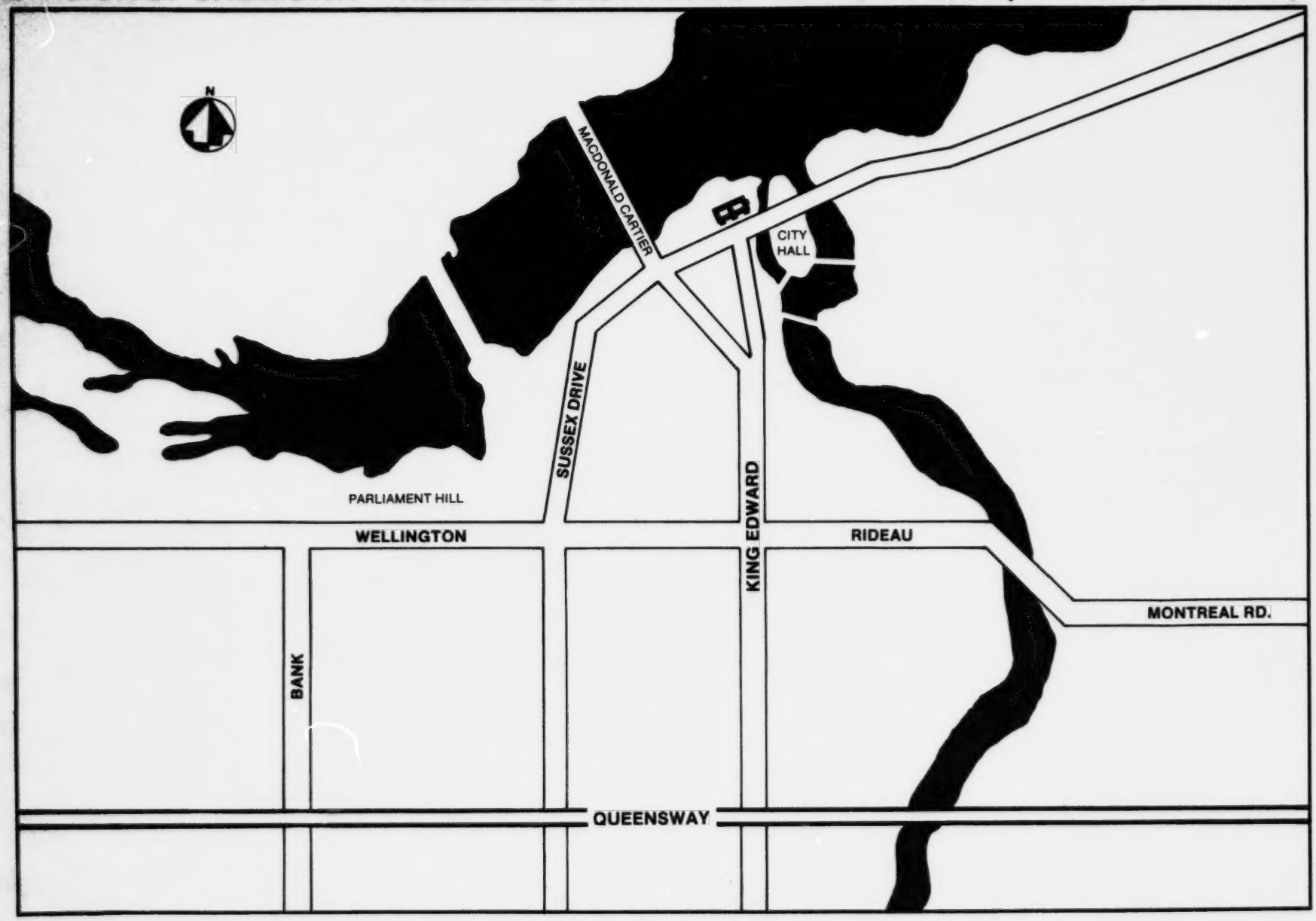
- Measurement of the rheological properties of polymers and plastics (suspensions, solutions, melts) in a simple and dynamic shearing field.
- Characterization of polymers, incl. polyphase plastics (molecular mass distribution, intrinsic viscosity, composition, morphology, structure).

- Studies of mass transfer properties (gas diffusion, thermal conductivity).

- Characterization of the surface and interface properties of polymers, alloys and metallic composites.

- Studies of the viscoelastic, mechanical and dielectric properties of plastics (between -160°C and +450°C).

DIVISION OF BIOLOGICAL SCIENCES • CANADA CENTRE FOR SPACE SCIENCE
DIVISION OF CHEMISTRY • HERZBERG INSTITUTE OF ASTROPHYSICS (OTTAWA, ONTARIO)



Canada Centre for Space Science

DIRECTOR	Dr. I.B. McDiarmid	(613) 992-7884
ASSISTANT DIRECTOR	Dr. A.L. Vankoughnett	(613) 996-5766
ADMINISTRATIVE OFFICER	L. Erwin	(613) 992-0211
SECTION HEADS		
Scientific Planning and Evaluation Group	Dr. G. Atkinson	(613) 992-0304
Facilities Branch Instrumentation Section	Mr. K. Gruno	(613) 992-0872
Engineering Section	Mr. R.D. Hendry	(613) 996-5797
Operations Section	Mr. B.L. Wetter	(613) 996-5836

SCIENTIFIC PLANNING AND EVALUATION GROUP

Dr. G. Atkinson
Telephone (613) 992-0304

- conducts forward planning to ensure effective use of CCSS resources and to ensure effective response to opportunities (national and international) for space research
- solicits and evaluates proposals for funding of space science projects
- reviews projects which are in progress to ensure that scientific objectives are being met and to ensure that project resources are being used effectively
- cooperates with the Natural Sciences and Engineering Research Council (NSERC) to coordinate CCSS and NSERC funding support for projects
- provides a secretariat for the NRC Associate Committee on Space Research. The ACSR also functions as an advisory body to the Interdepartmental Committee on Space
- initiates and negotiates new opportunities for space research and solicits participation from the Canadian space science community.

FACILITIES BRANCH

INSTRUMENTATION SECTION

Mr. R. Gruno
Telephone (613) 992-0872

- provides project management for development by industry of space science instrumentation systems
- provides mission analysis and systems engineering for space science instrumentation
- designs and develops space science instrumentation for space shuttle and satellite flight systems
- designs and develops instrumentation for charged particle detection, optical detection and imaging, ultraviolet imaging, radar imaging and radio frequency plasma wave.
- designs and develops networks for collecting data from remote, unmanned observatories

- designs and develops computer networks for interactive scientific processing involving graphics, voice and data communications
- maintains liaison with international space agencies for cooperative space science projects

ENGINEERING SECTION

Mr. R.D. Hendry
Telephone (613) 996-5797

- provides project management for development in industry of rocket payload and vehicle systems, telemetry, tracking and data processing systems
- provides mission analysis and systems engineering services for scientific rocket payloads and flight systems and satellite subsystems
- designs and develops rocket payloads and rocket vehicle systems
- designs and develops telemetry, tracking and data processing systems for space science use
- designs and develops experimental instrumentation for space science use

OPERATIONS SECTION

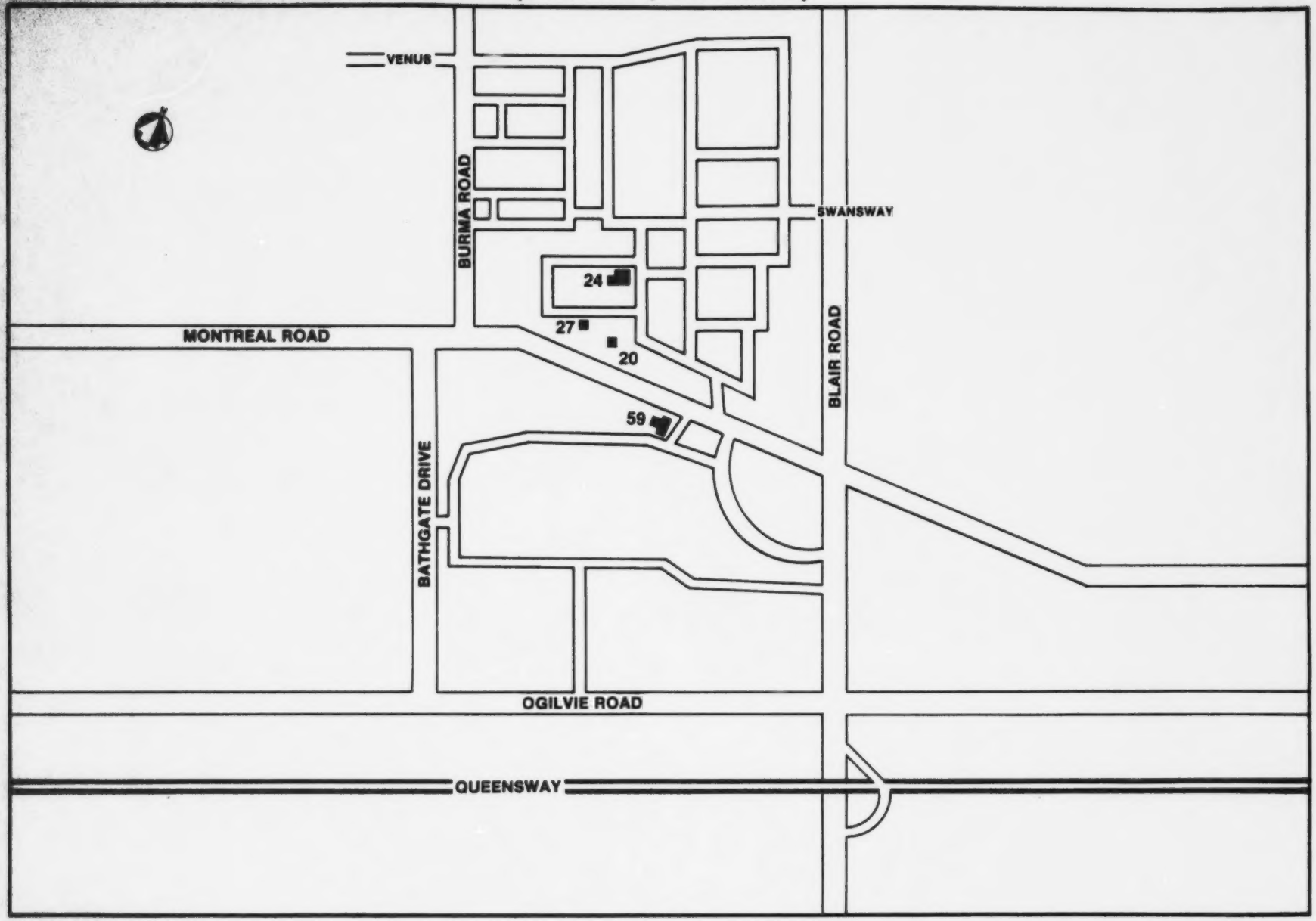
Mr. B.L. Wetter
Telephone (613) 996-5836

- provides project management for operations and maintenance of facilities for space research, through contracts to industry
- operates and maintains facilities for launching and recovering scientific rockets and balloons
- operates, maintains and develops tracking, telemetry, processing, recording, communications and control systems
- installs and operates remote ground-based observatories for space science
- provides mission analysis and systems engineering services for scientific balloon flight systems

- conducts flight performance analysis and coordinates with central agencies for flight and ground environment safety involving rockets, balloons and aircraft

- conducts boundary layer and high altitude meteorological observations and analysis

DIVISION OF BUILDING RESEARCH (OTTAWA, ONTARIO)



20 — BUILDING RESEARCH
24 — ENVIRONMENTAL ENGINEERING
59 — FIRE RESEARCH
27 — NOISE AND VIBRATION

Division of Building Research

DIRECTOR	Mr. C.B. Crawford	(613) 993-2443
ASSOCIATE DIRECTOR	Dr. L.W. Gold	(613) 993-2480
EXECUTIVE ASSISTANT TO THE DIRECTOR	Mr. K.C. MacFarlane	(613) 993-2365
COORDINATOR, BUILDING TECHNOLOGY	Mr. G.O. Handegord	(613) 993-0090
COORDINATOR, ENERGY PROGRAM	Dr. D.G. Stephenson	(613) 993-1421
ADMINISTRATIVE OFFICER	Mr. P.V. Lyons	(613) 993-2477

SECTION HEADS

Building Materials	Dr. V.S. Ramachandran	(613) 993-1596
Building Performance	Mr. A.H. Wilson	(613) 993-1231
Building Structures	Mr. W.A. Dalgliesh	(613) 993-2433
Energy and Services	Dr. R.C. Biggs	(613) 993-9580
Fire Research	Dr. T.Z. Harmathy	(613) 993-2204
Geotechnical	Mr. E. Penner	(613) 993-1466
Instrumentation	Dr. J.J. Park	(613) 993-0697
Noise and Vibration	Dr. A.C.C. Warnock	(613) 993-2305
Thermal Performance	Mr. J.R. Sasaki	(613) 993-1421
Thermal Properties	Mr. K.R. Solvason	(613) 993-1421
Technical Information Group	Mr. G.P. Williams	(613) 993-2607
Codes and Standards Group	Mr. R.A. Hewett	(613) 993-9960
B.C. Regional Station	Mr. M.C. Baker	(604) 542-4828
Prairie Regional Station	Dr. C.P. Hedlin	(306) 665-4200
Atlantic Regional Station	Mr. D.C. Tibbetts	(902) 426-8255

BUILDING MATERIALS SECTION

Dr. V.S. Ramachandran
Telephone (613) 993-1596

The Building Materials Section provides basic information on the properties and behaviour of building materials, assists in the preparation of standards and specifications, develops test methods to evaluate the performance of various building materials and assists industry and agencies in solving problems of national importance. The general activity encompasses the characterization and evaluation of the performance of materials, such as concrete, sealants, paints, plastics, roofing materials and clay bricks, utilizing chemical, physical and mineralogical techniques.

BUILDING PERFORMANCE SECTION

Mr. A.H. Wilson
Telephone (613) 993-1231

The Building Performance Section develops information on the performance of buildings of all types. The activities necessary to achieve this objective include socio-economic analyses, the study of the design and construction processes, the observation and analysis of the operation, use and maintenance of buildings, and the study of the process of rehabilitation. The achievement of this objective requires interaction with designers, contractors, suppliers, developers, owner and operators, as well as economists and social scientists and persons engaged in the regulation of building construction.

BUILDING STRUCTURES SECTION

W.A. Dalgliesh
Telephone (613) 993-2433

The Building Structures Section complements research on structural behaviour done outside the Division by studying climatic loads such as wind and snow, developing improved safety and serviceability criteria for structural design, contributing to the adoption of the limit states approach, and collecting information on building failures. Most of the projects are developed in response to specific needs in structural design practice or matters regarding the application of the National Building Code.

ENERGY AND SERVICES SECTION

Dr. R.C. Biggs
Telephone (613) 993-9580

The Energy and Services Section provides the knowledge base required for the design and operation of building services, taking into account current and anticipated standards on energy performance and various aspects of the interior environment and economic considerations. Areas of interest include energy use and conservation in large buildings; the energy conservation potential of district heating systems; and various aspects of the interior environment, such as illumination, air movement and quality, thermal comfort, and smoke movement and control.

FIRE RESEARCH SECTION

Dr. T.Z. Harmathy
Telephone (613) 993-2204

The Fire Research Section conducts research aimed at reducing loss of life and property from fire in Canada. Studies are generally initiated in response to inquiries from regulatory officials, building materials manufacturers and building designers. The Section also responds to requests for assistance in the development and revision of standard methods for evaluating the fire performance of building materials and assemblies of building materials. Part of the research activity is long-term, aimed at building up basic knowledge on the fire-related characteristics of materials and products, and on fire processes. The remainder is aimed at solving immediate problems, and covers fire performance tests and techniques of design for fire safety.

GEOTECHNICAL SECTION

Mr. E. Penner
Telephone (613) 993-1466

The Geotechnical Section serves the construction industry through studies of soils, rock, permafrost, snow and ice, and how they are influenced by environmental factors and human activity. Research priorities are based on need, the uniqueness of the problem to Canadian conditions and the resources available. The approach consists of investigating the performance of engineering structures and natural deposits in the field, and studying the material in both the field and the laboratory.

INSTRUMENTATION UNIT

Dr. J.J. Park
Telephone (613) 993-0697

The Instrumentation Unit provides advice and consultative services on instrumentation and systems design to the research sections, coordinates the selection and purchasing of new equipment and provides technical support for the proper maintenance of instrumentation and related equipment. These objectives are pursued through two areas of activity: general instrumentation, and computerized data acquisition and control systems.

NOISE AND VIBRATION SECTION

Dr. A.C.C. Warnock
Telephone (613) 993-2305

The Noise and Vibration Section is concerned with problems of vibration and acoustics as related to buildings. Research proceeds at three levels: (1) studies of basic physical processes of propagation of sound and vibration in buildings; (2) studies of responses of people to sounds and vibrations in their environment, and establishment of quantitative physical descriptors that correlate with human response; (3) development of standard methods of measurement of the requisite physical descriptors. The commitment, beyond the research, is to apply the results to the solution of specific building problems and to produce tutorial papers and other means of conveying the information to the builder and to the public.

THERMAL PERFORMANCE SECTION

Mr. J.R. Sasaki
Telephone (613) 993-1421

The objective of the Thermal Performance Section is to determine the dependence of the thermal performance of new and existing residential buildings on their design, construction, mode of operation, and heating and ventilation systems. Emphasis is placed on supporting the federal program to reduce the energy consumed for service hot water heating and space heating and cooling in buildings without reducing indoor thermal comfort or indoor air quality, and without increasing moisture-related problems.

THERMAL PROPERTIES SECTION

Mr. K.R. Solvason
Telephone (613) 993-1421

The Thermal Properties Section develops and operates facilities for determining the thermal characteristics of building materials and components such as walls, windows and doors. It is engaged in the development of methods for testing materials and components, and is heavily involved with standards committees for building materials and committees on thermal measurement techniques. It also performs a number of commercial tests for manufacturers to aid in their development programs or to demonstrate compliance with specifications or acceptance criteria.

TECHNICAL INFORMATION GROUP

Mr. G.P. Williams
Telephone (613) 993-2607

Although all research officers play a role in information transfer, it is the Technical Information Group that has official responsibility in this endeavour. The Group has three functions: (1) it is responsible for editing, translating, publishing and distributing all research papers and publications written in the Division; (2) it maintains a technical library housing Canada's largest collection of construction literature, available not only to researchers but to all practitioners in the construction industry; (3) it is responsible for answering the hundreds of technical inquiries received from the industry each year on a wide variety of building problems. Staff are also involved in numerous other technology transfer activities such as building science forums, technical committees, lectures, and liaison with other agencies.

CODES AND STANDARDS GROUP

Mr. R.A. Hewett
Telephone (613) 993-9960

The National Building Code and the National Fire Code of Canada are prepared and published under the authority of the Associate Committee on the National Building Code and the Associate Committee on the National Fire Code, respectively. These Codes are advisory until adopted by a municipal or provincial authority, and are made available in this form to encourage uniformity of regulations across the country. The Associate Committees responsible for these Codes are appointed by the National Research Council and are widely representative of the construction industry.

The Division of Building Research, through its Codes and Standards Group, supports the production of the two Codes and their associated documents by providing secretarial and technical services for the Associate Committees and their respective technical committees.

BRITISH COLUMBIA REGIONAL STATION

Mr. M.C. Baker
Telephone (604) 542-4828

The B.C. Regional Station was established in 1956 to provide a communications and information service to the construction industry. Activities fall into three broad areas: (1) provision of a sales outlet for the National Building Code (NBC) of Canada and associated documents, and a technical information service in relation to the contents of the NBC; (2) provision of technical information on building envelope design, construction and performance; (3) field observations of construction and building performance.

PRAIRIE REGIONAL STATION

Dr. C.P. Hedlin
Telephone (306) 665-4200

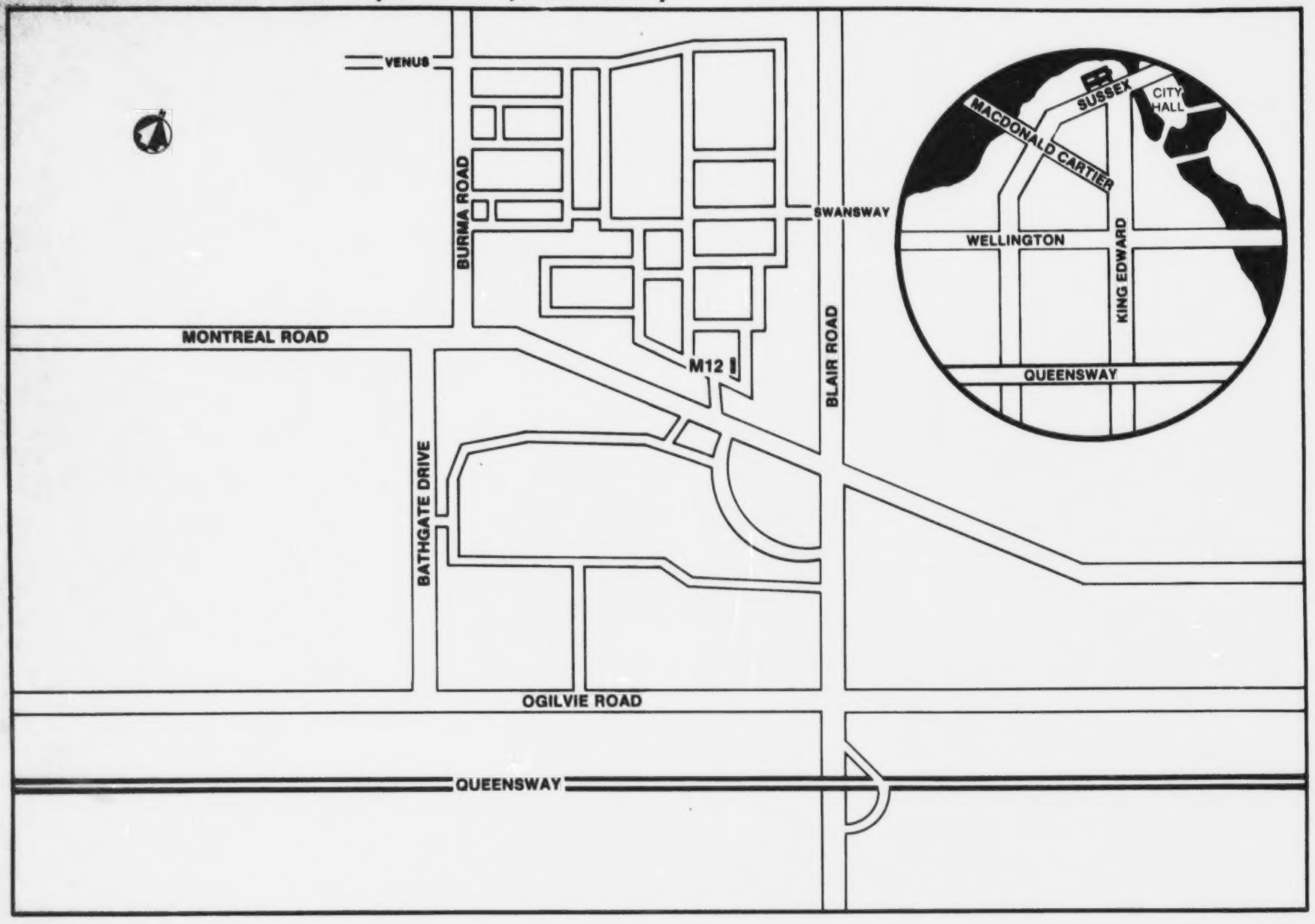
The Prairie Regional Station serves the construction industry in the three Prairie Provinces through applied research and technical information services aimed at improving the design, construction and operation of buildings and other structures. The station provides a communication link between the design professions, construction firms and agencies, users of buildings, and research headquarters in Ottawa. Current design and construction practices and problems of the region are reported to headquarters; similarly, performance problems are reported to the appropriate segments of the industry. The research activities of the station are designed to fill special needs within the region. The severely cold, dry climate and the glacial geology of the region are the main natural factors affecting the construction and performance of structures. The station has the facilities and the expertise to study building materials and systems in actual use or in controlled environments in the laboratory.

ATLANTIC REGIONAL STATION

Mr. D.C. Tibbetts
Telephone (902) 426-8255

Liaison with the construction industry in the Atlantic Region is the function of the station in Halifax. The regional purpose is best served by a proper understanding of construction practices leading to research priorities consistent with local needs; this necessitates visits to building sites and liaison with industry associations and government agencies. The station has no laboratory program but does operate an exposure test site with the practical potential for measuring the performance of materials and systems under natural conditions. An important adjunct to the facility is the on-site acquisition of climatic data. The station participates in training activities leading to improved building and inspection practices to ensure that the intent of modern codes and standards is met.

DIVISION OF CHEMISTRY (OTTAWA, ONTARIO)



Division of Chemistry

DIRECTOR	Dr. D.M. Wiles	(613) 993-2330
ASSOCIATE DIRECTOR	Dr. K.U. Ingold	(613) 992-3335
ADMINISTRATIVE OFFICER	M.L. Pageau	(613) 993-2396
SECTION HEADS		
(Montreal Road)		
Analytical Chemistry	Dr. S. Berman	(613) 993-2043
Chemical Engineering	Dr. C.E. Capes	(613) 993-2455
Colloid & Clathrate Chemistry	Dr. D.W. Davidson	(613) 993-2011
High Polymer Chemistry	Dr. S. Bywater	(613) 993-2097
High Pressure	Dr. E. Whalley	(613) 993-2520
Kinetics and Catalysis	Dr. J.R. Morton	(613) 993-2372
Metallic Corrosion and Oxidation	Dr. M.J. Graham	(613) 993-3548
Solid State Chemistry	Dr. C.M. Hurd	(613) 993-2517
Textile Chemistry	Dr. D.M. Wiles	(613) 993-2268
(Sussex Drive)		
Chemical Physics	Dr. D.F. Williams	(613) 992-5614
Hydrocarbon Chemistry	Dr. K.U. Ingold	(613) 992-3335
Molecular Spectroscopy	Dr. H.H. Mantsch	(613) 992-4769
Organic Chemistry	Dr. O.E. Edwards	(613) 992-4092
Photochemistry and Kinetics	Dr. R.A. Back	(613) 996-3732
Laser Chemistry	Dr. P.A. Hackett	(613) 992-2024
Theoretical Chemistry	Dr. W. Siebrand	(613) 992-6808
Thermochemistry	Dr. G.C. Benson	(613) 992-3839

CHEMICAL ENGINEERING SECTION

Dr. Ed Capes
Telephone (613) 993-2455

- performs fundamental research to provide guidelines for the specification and development of membranes for conventional and novel reverse osmosis (RO) and ultrafiltration (UF) applications.
- studies the application of agglomeration and other particle technologies to the recovery, dewatering and upgrading of waste fine coals and to the improved cleaning of run-of-mine coals.
- cooperates with industry to demonstrate RO, UF and agglomeration techniques in both laboratory and plant environments, often in conjunction with CPDL licensees and with the aid of a mobile pilot plant.
- applies chemical engineering principles to a diversity of important problems ranging from the properties of porous media and particle systems and the development of membranes for electrolysis applications to the testing of materials for thermal energy storage and the preparation and combustion of coal liquid mixtures.

ANALYTICAL CHEMISTRY SECTION

Dr. Shier Berman
Telephone (613) 993-2043

- provides analytical chemistry services to personnel in the Division of Chemistry and other National Research Council divisions.
- provides analytical chemistry services, on a selective basis, to government departments, industry, universities and the public.
- develops applied techniques necessary for the service functions.
- is responsible for the inorganic aspects of NRC's Marine Analytical Chemistry Standards Program.
- develops reference materials for trace metals in marine materials.
- develops separation, concentration and measurement procedures for trace metals in various materials of marine and environmental interest.
- pursues research and development in various aspects of inorganic analytical spectroscopic techniques such as graphite furnace atomic absorption, inductively coupled plasma atomic emission, solid source mass spectroscopy, x-ray fluorescence.

- pursues research and development in various organic separation, identification, and measurement techniques such as gas chromatography, gas chromatography-mass spectrometry, infrared spectrometry.

COLLOID AND CLATHRATE CHEMISTRY SECTION

Dr. D.W. Davidson
Telephone (613) 993-2011

- develops improved methods of recovery of bitumen from oil sands through spherical agglomeration and related techniques.
- applies the concepts of colloid science to the solution of problems of industrial concern.
- develops and uses new techniques (e.g. solid state nuclear magnetic resonance) for the study of fossil fuels.
- studies by a variety of experimental and theoretical methods the properties of gas hydrates.
- conducts fundamental research into molecular motion and structures of clathrates and other solid systems.
- measures the properties of simple gases adsorbed on carbon surfaces.

HIGH POLYMER SECTION

Dr. S. Bywater
Telephone (613) 993-2097

- studies the mechanisms of formation of stereospecific polymers and investigates methods for their characterization.
- develops and uses methods to investigate polymer-polymer interactions and reactions between polymers.
- develops methods for the preparation of polymers of well-defined branch characteristics and investigates their physical properties.
- provides routine analysis by nuclear magnetic resonance techniques to the division and other organizations.
- develops advanced nuclear magnetic resonance techniques to improve the service supplied.
- studies the structure of homogeneous catalytic complexes.

HIGH PRESSURE SECTION

Dr. E. Whalley
Telephone (613) 993-2520

- develops equipment for measuring the properties of solids and fluids at high pressure.
- measures and correlates the thermodynamic properties of fluids at high pressure.
- measures the effect of pressure on the structure and relaxation of fluids.
- measures the effect of pressure on chemical reactions.
- measures phase equilibria and vibrational spectra of solids under pressure.

KINETIC AND CATALYSIS SECTION

Dr. J.R. Morton
Telephone (613) 993-2372

- studies chemical reactions important in the atmosphere, for example OH with Freons and CO and oxygen atoms with sulfur compounds.
- studies the water gas shift reaction over an iron/zeolite catalyst and also formation of methanol from CO or CO_2 and hydrogen.
- prepares metallic clusters on a rotating cryostat and identifies them by EPR spectroscopy.
- prepares free radicals from transition metal derivatives (notably carbonyls) and characterizes them by single crystal EPR spectroscopy.

METALLIC CORROSION AND OXIDATION SECTION

Dr. Michael Graham
Telephone (613) 993-3548

- studies the growth and structure of thin oxide films on metals and alloys
- investigates the mechanism of formation and breakdown of protective oxide films in aqueous environments.

- examines the processes involved in the degradation of metals and alloys during high temperature oxidation and sulphidation.
- investigates the quantification of a variety of surface-analytical techniques and their application to corrosion research.
- provides advice on corrosion-related problems.

SOLID STATE CHEMISTRY SECTION

Dr. C.M. Hurd
Telephone (613) 993-2514

- investigates the microscopic origins of the electrical and magnetic properties of solids.
- studies the physical and chemical properties of reversible intercalation.
- investigates calorimetrically intermetallic-hydrogen reactions and hydride formation.
- applies x-ray crystallography to structure determination.
- develops crystallographic computing techniques and automatic diffractometry.
- compiles and disseminates crystallographic data.
- administers the Federal Energy Conversion and Hydrogen Storage Programme.

TEXTILE CHEMISTRY SECTION

Dr. D.J. Carlsson
Telephone (613) 993-2268

- investigates plastics, fibres and composites in terms of structure-property relationships with emphasis on crystallinity, orientation, resin chemistry and resin-filler interactions.
- studies the combustion of fibres and fabrics with respect to pyrolysis and oxidative processes and explores the effects of flame retardants on these processes.
- examines the stabilization and degradation of fibres and plastics under the influence of heat and light and studies the role of additives in the prevention of destructive processes and the extension of operational life of these materials.

- evaluates test methods for fibres and fabrics including new international methods and develops test methods and standards suitable for Canadian needs.

CHEMICAL PHYSICS SECTION

Dr. D.F. Williams
Telephone (613) 992-5614

- studies the preparation and fundamental electrical and optical properties of thin film semiconductors.
- applies electron spin resonance spectroscopy to study mechanisms of energy transport and of phase transitions in organic molecular crystals.
- examines the behaviour and properties of short lived reaction intermediates involved in processes in solution, polymers and organized aggregates using laser techniques.

HYDROCARBON CHEMISTRY SECTION

Dr. Keith Ingold
Telephone (613) 992-3335

- investigates the rates and mechanisms of free-radical reactions in solution.
- studies the structures and reactivities of carbenes and free-radicals.
- synthesizes new antioxidants and test their effectiveness in vitro.
- conducts studies on normal and isotopically labelled Vitamin E.
- investigates the biological role of Vitamin E in normal and cancerous tissue.

MOLECULAR SPECTROSCOPY SECTION

Dr. Henry H. Mantsch
Telephone (613) 992-4769

- develops spectroscopic instrumentation and techniques for the structural characterization of complex chemical and biological systems.

- studies artifical and biological membranes utilizing Fourier transform infrared and laser Raman spectroscopy.
- investigates the structure of aqueous surfactants.
- studies temperature and pressure induced phase transitions utilizing vibrational spectroscopy.
- studies molecular interactions in the gas, liquid and solid phases.
- maintains computer based programs for the automatic identification of materials from their infrared spectra.

ORGANIC CHEMISTRY SECTION

Dr. O.E. Edwards
Telephone (613) 992-4092

- performs fundamental studies in organic electrochemistry, directed at ways of building molecules difficult to prepare otherwise.
- develops new methods for synthesis of molecules with known or potential medicinal activity.
- studies transformations of readily available natural products into important rare biologically active compounds.

PHOTOCHEMISTRY AND KINETICS SECTION

Dr. R.A. Back
Telephone (613) 996-3732

- studies fundamental processes in the photochemistry of gases, including visible-ultraviolet systems and infrared multiphoton reactions using pulsed lasers.
- investigates kinetics of the reactions of atoms, free radicals in gas-phase thermal, photochemical and radiation chemistry systems.
- explores the microscopic dynamics of elementary reactions of atoms, free radicals and molecules in the gas phase, using infrared chemiluminescence and molecular-beam techniques.
- examines reactions of transient species in liquid-phase photochemical systems in the nanosecond and picosecond time regimes.

LASER CHEMISTRY GROUP

Dr. Peter Hackett
Telephone (613) 992-5958

- promotes the use of laser technology in industrial applications.
- develops laser methods for remote sensing, process monitoring and chemical analysis.
- develops laser isotope separation methods using multiphoton and single photon techniques.
- applies laser techniques to problems in synthetic organic photochemistry with the object of developing improved synthetic schemes.
- studies inorganic photochemistry with particular emphasis given to the production, reactions and clustering of metal atoms.

THEORETICAL CHEMISTRY SECTION

Dr. Willem Siebrand
Telephone (613) 992-6808

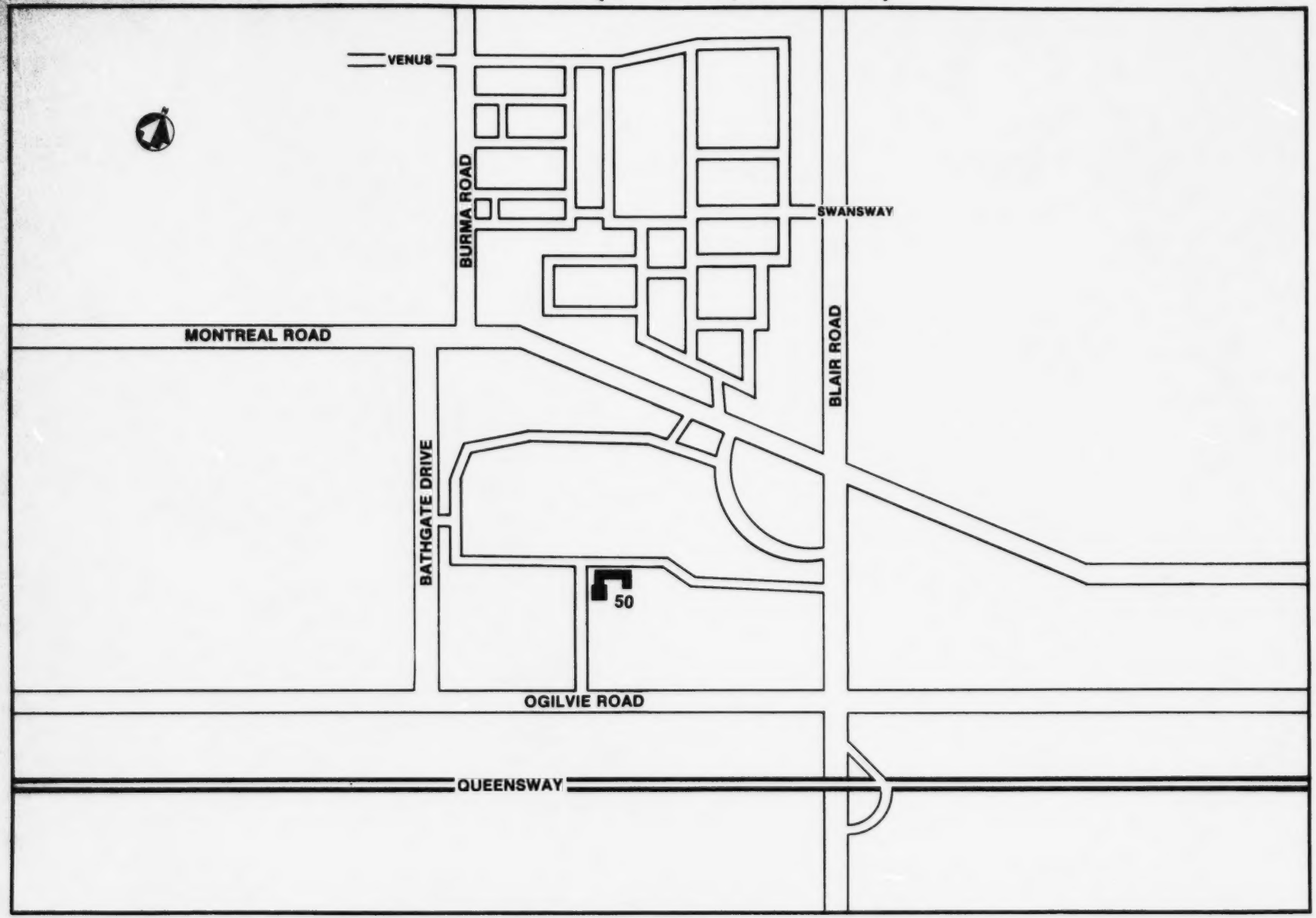
- studies equilibrium and dynamical properties of solids and liquids, with special emphasis on disordered materials, through computer simulation and other statistical-mechanical techniques.
- studies the dynamics of laser-excited resonance fluorescence in atoms and molecules by analytical methods.
- studies the generation and decay of excited and ionized states in molecules and molecular crystals by quantum-mechanical methods with special emphasis on organic systems.
- studies static and dynamic properties of biomolecules and biopolymers including protein folding and enzyme action through computer simulation.

THERMOCHEMISTRY SECTION

Dr. George Benson
Telephone (613) 992-3839

- studies thermodynamic properties of liquids and binary mixtures.
- uses calorimetric techniques to determine the heat capacities and excess enthalpies of binary liquid mixtures.
- investigates the volumetric properties of liquids through density, dilatometric and ultrasonic measurements.
- correlates thermodynamic data by means of empirical and theoretical relations.

DIVISION OF ELECTRICAL ENGINEERING (OTTAWA, ONTARIO)



Division of Electrical Engineering

DIRECTOR	Dr. J.Y. Wong	(613) 993-1384
ASSISTANT DIRECTOR	Dr. J.P. Hobson	(613) 993-9196
ADMINISTRATIVE OFFICER	Mrs. M. Carter	(613) 993-2530
PROGRAM MANAGER		
Biomedical Engineering Research Program	Mr. O.Z. Roy	(613) 993-0330
SECTION HEADS		
Computer Graphics	Mr. N. Burtnyk	(613) 993-0261
Electromagnetic Engineering	Mr. W. Lavrench	(613) 993-1268
Electron Physics	Dr. J.P. Hobson	(613) 993-9196
Electronics Engineering	Mr. J. Domey	(613) 993-2557
Information Science	Mr. O.Z. Roy	(613) 993-0330
Power Engineering	Dr. M.M.C. Collins	(613) 993-2660
Rehabilitation Technology Unit (Toronto)	Mr. J. Batelaan	(416) 499-3222

COMPUTER GRAPHICS SECTION

Mr. Nestor Burtnyk
Telephone (613) 993-0261

- develops computer graphics techniques and advanced display technology in support of computer aided design applications
- develops fundamental principles and practical applications in computer vision and in industrial machine vision
- develops multiprocessor system architectures and control structures for applications to industrial robots and intelligent machines
- develops advanced robotics incorporating sensory control for applications in automated manufacturing

ELECTROMAGNETIC ENGINEERING SECTION

Mr. William Lavrench
Telephone (613) 993-1268

- develops mathematical techniques for the solution of fundamental problems in electromagnetic and antenna theory and problems of interest to other sections
- develops measurement methods and maintains facilities for the design and evaluation of antennas and for the analysis of electromagnetic interference and by membership on Canadian Standards Association committees assists in the production of standards dealing with electromagnetic interference
- applies radar principles to study the polarization effects of precipitation
- promotes the direct conversion of microwave energy to heat for industrial applications, and develops moisture and electromagnetic radiation sensors

ELECTRON PHYSICS SECTION

Dr. Peter Hobson
Telephone (613) 993-9196

- investigates the measurement, creation, processes, and application of ultrahigh vacuum technology

- studies surfaces with regard to their order, chemical and physical properties, utilising beams of electrons, ions, molecules, and photons

- prepares single crystals of lanthanum hexaboride in conjunction with a study, both experimental and theoretical, of other properties relevant to their use as thermionic emitters for electron guns

- investigates quantum electronics and the physical processes controlling the operation of lasers with particular emphasis on the linewidth and potential application of optical memories

- applies tunable narrow linewidth lasers to optical spectroscopy of rare earth solids

- maintains and operates a liquid helium facility supplying liquid helium to internal and external users

ELECTRONICS ENGINEERING SECTION

Mr. Jacques Domey
Telephone (613) 993-2557

- develops instrumentation and software for intelligent robotic sub-systems in the following areas:

  - optical-electronic measurement and inspection systems;
  - three-dimensional vision system;
  - optical filtering techniques;
  - microprocessor systems;
  - interface between measurement and control systems.

- develops direct solar to energy conversion in these areas:

  - development of photovoltaic power systems/devices;
  - development of electronic power conversion and control equipment for photovoltaic applications;
  - evaluation of the performance of photovoltaic modules.

- maintains and repairs the division's electronic instruments

INFORMATION SCIENCE SECTION

Mr. Jack Brahan
Telephone (613) 993-2484

- maintains and operates a computer network for cooperative research in computer-aided design and manufacture and computer-aided training

- develops terminals and software for specialized interactive computer applications

- develops and evaluates a national authoring language (NATAL) and supporting software for computer-aided learning

- pursues information storage and retrieval activities with a focus on data base systems for CAD/CAM applications

- studies computer-aided design with a focus on development of computer-based models to assist in the design decision process

- develops electronic data processing standards through membership on government and Canadian Standards Association committees

MEDICAL ENGINEERING SECTION**

Mr. Orest Roy
Telephone (613) 993-0330

- develops instrumentation and techniques which define and analyze biological processes as they relate to the clinical situation

- develops technical aide to improve and increase the independence, vocational opportunities and quality of lift of those with congenital or acquired disabilities, including aging

- studies the effects of non-ionizing radiation, for example, ultrasound and electric current flow, on body tissues and develops measurement methods to establish national safety standards

- develops improved methods of data collection, analysis and interpretation for the enhancement of the intellectual capabilities of the health worker and physiological investigator, by facilitating decision making

** Projects are also part of the Biomedical Engineering Research Program managed by Mr. Orest Roy.

POWER ENGINEERING SECTION

Dr. Malcolm Collins
Telephone (613) 993-2660

- develops precision instrumentation for the electrical power industry and standards laboratories

- studies the deterioration of high voltage insulation systems under the influence of various environmental factors

- analyzes high voltage impulse measuring systems for application to industrial calibration and international standardization
- studies the environmental effects of high-voltage direct-current transmission lines
- develops measuring systems for ultra fast impulses

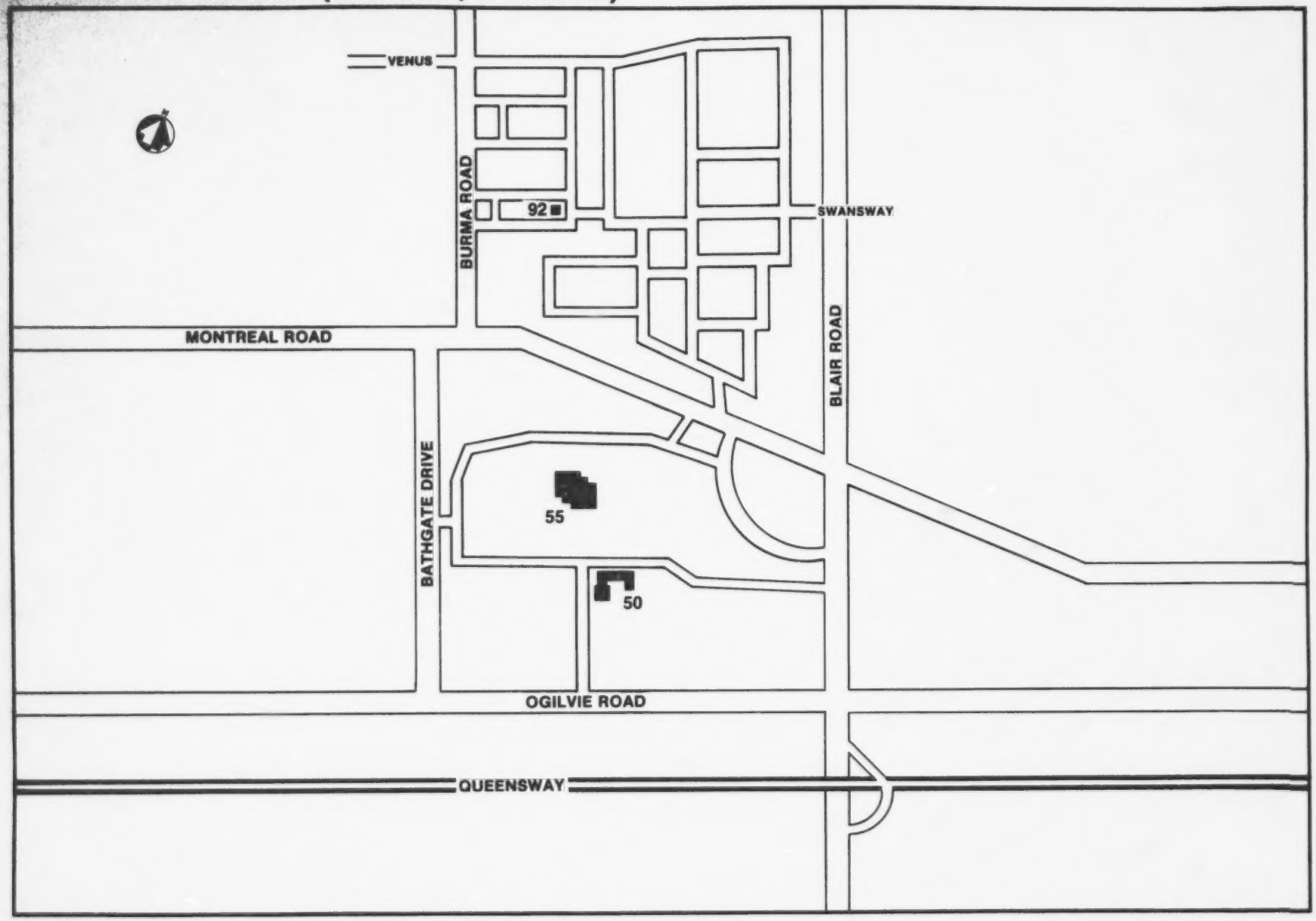
REHABILITATION TECHNOLOGY UNIT**

3781 Victoria Park Avenue, Unit 3
Scarborough, Ontario M1W 3K5
Mr. J. Batelaan
Telephone (416) 499-3222

- assists Canadian industry in the production of aids which are in low demand but of substantial benefit to disabled persons
- develops models and subsequent improvements of aids for production by small manufacturers
- assists TASH Inc., a marketing agency of the aids, with technical support
- contracts with manufacturers for development and/or initial production of new or improved aids
- develops consumer product adaptations or accessories to aid disabled persons

** Projects are also part of the Biomedical Engineering Research Program managed by Mr. Orest Roy.

DIVISION OF ENERGY (OTTAWA, ONTARIO)



50 — ENERGY PROJECT
55 — ENERGY PROJECT
92 — ENERGY PROJECT

Division of Energy

DIRECTOR	Dr. E.P. Cockshutt	(613) 993-3405
ASSISTANT DIRECTOR	Mr. M.S. Chappell	(613) 993-3405
ADMINISTRATIVE OFFICER	Miss I. Foster	(613) 993-3424
MANAGERS		
Hydrogen and Energy Storage Program	Dr. J.B. Taylor	(613) 993-0770 (613) 993-2506
Solar Energy Program	R.M. Aldwinckle	(613) 993-2730
Peat Energy Program	T.E. Tibbetts	(902) 426-7532
Heat Pump Program	J.R. Wright	(613) 993-0922
Wind Energy Program	M.S. Chappell	(613) 993-3405
Fusion Energy Program	T.S. Brown	(613) 993-0810
Bioenergy Program	R.P. Overend	(613) 993-1342

HYDROGEN AND ENERGY STORAGE PROGRAM

J.B. Taylor
Telephone (613) 993-0770 / 993-2506

- coordinates and manages a national program related to the storage of energy, including the use of hydrogen as an energy carrier
- in collaboration with industrial and other contractors, develops advanced systems for hydrogen production by electrolytic and other processes
- studies appropriate systems for the transmission and storage of hydrogen, as hydrides and high-pressure fluids
- develops and evaluates systems for hydrogen utilization, including electrochemical systems (fuel cells) and mechanical systems (heat engines)
- develops and evaluates other energy storage systems, including electrochemical storage batteries and high-energy flywheels

SOLAR ENERGY PROGRAM

R.M. Aldwinckle
Telephone (613) 993-2730

- coordinates and manages a national program of research and development on the use of solar energy, including passive and photovoltaic as well as active thermal systems
- guides and supports the generation of basic research and data collection related to utilization of solar energy in Canada
- in collaboration with Canadian industry, develops components, products and systems for the economical harnessing of solar energy, and assists in the establishment of an indigenous solar energy industry
- analyses, correlates and disseminates information on solar energy to government, industrial and user communities, in forms appropriate to their needs
- contributes technically to the establishment of standards in the manufacture, installation and maintenance of solar equipment

PEAT ENERGY PROGRAM

T.E. Tibbetts
Telephone (902) 426-7532

- coordinates and manages a national peat research and development program, related to peat as an energy stock
- conducts in-house research to develop novel uses for peat
- in cooperation with international agencies, develops standards for peat classification, terminology and test
- contracts peat research through requests for proposals (RFPs) and unsolicited proposals (UPs)
- maintains the secretariat and related functions of the Canadian National Committee of the International Peat Society

HEAT PUMP PROGRAM

J.R. Wright
Telephone (613) 993-0922

- coordinates and manages the federal program of research and development on heat pumps, to exploit their energy conservation capabilities
- evaluates industrial applications of heat pumps for energy recovery energy cascading, drying, heating
- develops and evaluates residential heat pump systems for space heating and cooling and for domestic water heating, both stand-alone or with auxiliary sources
- in collaboration with Canadian industry, develops system components and equipment, including control systems, refrigerants, valves, condensers, evaporators, motor drive systems

WIND ENERGY PROGRAM

M.S. Chappell
Telephone (613) 993-3405

- coordinates and manages federal government research and development in wind energy

- compiles and interprets meteorological data to identify regional wind energy resource availability and other climatological factors affecting wind turbine performance and longevity

- develops analytical and experimental methods for assessing effects of local topography on wind regimes at candidate turbine sites

- assesses circumstances under which wind energy may make cost effective contributions to Canadian energy supplies

- investigates fundamental aerodynamic and structural dynamic behaviour of vertical-axis wind turbines

- conducts laboratory and field trial experiments to verify performance and structural design techniques in collaboration with Canadian manufacturers and potential user agencies

- establishes Canadian standards for safety, performance etc., for small wind energy conversion systems via the Canadian Standards Association

FUSION ENERGY PROGRAM

T.S. Brown
Telephone (613) 993-0810

- coordinates and manages a national program of fusion-related research and development, towards a long-term inexhaustible energy option

- in collaboration with Hydro-Québec, operates the Canadian Centre for Magnetic Fusion, which has under construction a major national facility, the Tokamak de Varennes

- in collaboration with Ontario Hydro and the Ontario Government, operates the Canadian Fuels Technology Project, which is a contracted-out program of research designed to establish Canada as a world leader in the technologies for management of tritium as a fusion fuel

- coordinates a national program of research in inertial confinement fusion, focussed on high-power lasers and their interactions with plasmas

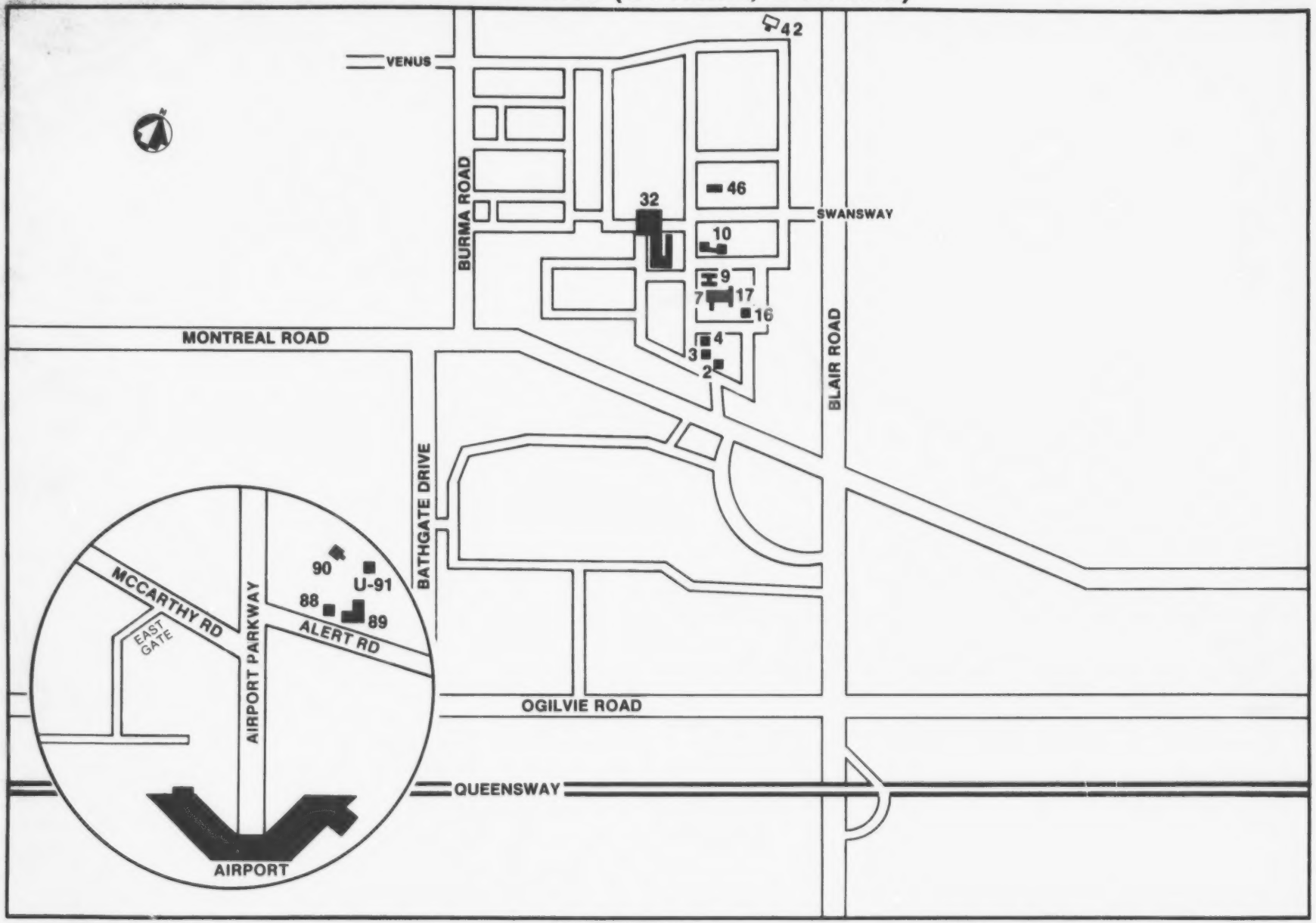
- coordinates a program of international collaboration with the fusion programs of the USA, Japan, and the European Community

BIOENERGY PROGRAM

R.P. Overend
Telephone (613) 993-1342

- co-ordinates and manages a national program of research and development in bioenergy
- supports research into the fundamental problems associated with the conversion of wood (cellulose, hemicellulose, lignin) into enhanced forms of energy
- develops improved technologies to allow complete mechanization of energy plantation systems including site preparation, planting, cultivation, harvesting, collection, pre-treatment and transportation
- studies the extent and nature of the biomass resource available in Canada for energy production, and assesses the technologies available to convert biomass to an appropriate form
- provides technical advice to the federal government relative to national bioenergy policies and programs

DIVISION OF MECHANICAL ENGINEERING (OTTAWA, ONTARIO)



2 — ANALYSIS LABORATORY
3 — CONTROL SYSTEMS AND HUMAN ENGINEERING
7 — ENGINE LABORATORY
9 — FUELS AND LUBRICANTS
10 — GAS DYNAMICS
32 — HYDRAULICS
17 — LOW TEMPERATURE
42 — SEAKEEPING AND MANOEUVRING BASIN
3, 4, 16 — MANUFACTURING TECHNOLOGY CENTRE
46 — PROPULSION TUNNEL
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UPLANDS

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88 — LOW TEMPERATURE CLIMATIC CHAMBER
89 — RAILWAY DYNAMICS
90 — STRENGTH TESTING

Division of Mechanical Engineering

DIRECTOR	Mr. E.H. Dudgeon	(613) 993-2424
ASSISTANT DIRECTOR	Mr. J. Ploeg	(613) 993-2417
ADMINISTRATIVE OFFICER	Mr. J.F. MacDonald	(613) 993-2446
OFFICE FOR INDUSTRIAL LIAISON	Dr. I.R.G. Lowe	(613) 993-3974
SECTION HEADS		
Engine Laboratory	H.S. Fowler	(613) 993-2425
Fuels and Lubricants Laboratory	R.B. Whyte	(613) 993-2415
Gas Dynamics Laboratory	R.A. Tyler	(613) 993-2442
Hydraulics Laboratory	J. Ploeg	(613) 993-2417
Low Temperature Laboratory	T.R. Ringer	(613) 993-2439
Manufacturing Technology Centre	G. McGregor	(613) 393-2471
Railway Laboratory	C.A.M. Smith	(613) 998-9638
Systems Laboratory	P.A. Hamill	(613) 993-9208
Western Laboratory	C. Dayson	(604) 732-4477

ENGINE LABORATORY

H.S. Fowler
Phone (613) 993-2425

Research Concentrations:

- Efficiency in Transportation

Primarily aimed at the improvement of energy use in road vehicle applications, studies in this area include aerodynamics, both internal and external, traffic control strategies for urban areas, and diesel to natural gas fuel conversion applications.

- Machinery for Energy Conversion

Research in this area concentrates on aviation and industrial gas turbines but includes other industrial rotating machinery such as fans and blowers. Activities cover a broad spectrum from fundamental studies of rotor dynamics and aero-acoustics, through applications to industrial transportation and health problems, as well as to operational problems and performance testing.

Facilities:

- Gas Turbine Engine Test Cells
  (one with aero-icing environment)
- Anechoic Test Cell
- Rotor Dynamics Facility
  (high speed balancing)

GAS DYNAMICS LABORATORY

R.A. Tyler
Phone (613) 993-2442

Research Concentrations:

- Engineering Gas Dynamics

Research is concerned with the flow of fluids at large flow rates and engineering temperatures such as are associated with prime movers, heat exchangers, industrial flues, smelters, etc. Fundamental and applied studies of combustion and of turbine and compressor aerodynamics, as related to industrial, marine and aviation gas turbines are important parts of this subject area. Heat transfer studies are related mainly to heat recovery systems. Work is extended to the study of the dynamics of fluids as found in the use of high pressure water jets for industrial cutting purposes.

- Plasma Dynamics

This project area involves studies of gases at very high temperatures and contributes to the basic knowledge and expertise necessary for the production, handling and use of such hot gases in present and future engineering applications. Research efforts encompass basic experimental, theoretical and numerical studies of hot gases produced by magnetically driven shock waves as well as near term industrial applications of the related phenomena.

Facilities:

- Small aviation gas turbine altitude test facility
- Compressor test facility
- Industrial gas turbine combustor test facility
- Large flow rate compressor and exhauster plants
- Wind tunnel for propulsion studies

HYDRAULICS LABORATORY

J. Ploeg
Phone (613) 993-2417

Research Concentrations:

- Coastal Engineering

Research is conducted on the physical processes of oceans, rivers, estuaries, etc., particularly in the near-shore zone, to assist in the exploitation of resources without environmental damage. This work involves basic studies of ice mechanics, wave mechanics and the simulation of realistic sea states so that forces on coastal and off-shore structures may be more accurately predicted.

- Hydraulic Energy

Studies focussing on the potential for ocean and river energy exploitation are concentrated on waves, currents and tides.

Facilities:

- Flumes, wave machines and hydraulic test basins
- Environmental test chamber (ice tank)
- Flowmeter calibration facility

LOW TEMPERATURE LABORATORY

T.R. Ringer
Phone (613) 993-2439

Research Concentrations:

- Energy Conservation and Conversion at Low Temperatures

Research concentrates on energy conversion and conservation with particular respect to heat pump equipment, solar energy equipment and refrigeration equipment in order to assist Canadian industry with product development suitable to northern environmental conditions.

- Climatic Effects on Industrial Equipment

The laboratory maintains and operates as National Facilities several large systems which are used extensively by various sectors of Canadian industry to verify operating specifications and safety standards compatibility of a range of industrial equipment under boreal climatic conditions.

Facilities:

- Climatic Engineering Test Chambers
- Helicopter Icing Spray Rig
- High speed, variable density, Icing Wind Tunnel

MANUFACTURING TECHNOLOGY CENTRE

G. McGregor
Phone (613) 993-2436

Research Concentrations:

- Advanced Manufacturing Systems and Processes

This research area focusses on the application of computer technology, including robotics, to the overall industrial manufacturing process. Work on flexible manufacturing systems integrates a five-axis machining centre with a robotic materials handling system.

Facilities:

- The Manufacturing Technology Centre also acts as the central experimental workshop for the Division. As such it is equipped with a broad range of machine tools and manufacturing capability including electron beam welding, laser cutting and welding, electro-chemical and electro-discharge machining as well as plasma cutting. There is also a large heat treatment facility and an extensive model shop.

RAILWAY LABORATORY

C.A.M. Smith
Phone (613) 998-9639

Research Concentrations:

- Wheeled Vehicle Dynamics

Analytical and experimental investigations of the dynamics of road and rail advanced vehicle concepts are carried out in this research area. In addition, this laboratory maintains and operates national facilities for rail vehicle research, testing and certification.

Facilities:

- Curved Track Simulator
- Railcar Vibration Test Stand
- Impact Ramp
- Instrumentation Railcar for over-the-road field work
- Railcar Squeeze Frame (AAR specifications)
- Shunting Locomotive
- High Altitude Test Chamber

SYSTEMS LABORATORY

P.A. Hamill
Phone (613) 993-9208

Research Concentrations:

- Industrial Automation and Ergonomics

Research in this area is directed toward the application, by Canadian industry, of new technologies in the field of automation and control. Fundamental studies of the human operator lead to a better understanding of the man-machine interface, knowledge which is vital to the successful use of automation technologies. Sensor development and microprocessor applications as well as software development for CAD and industrial robotics complement work on an experimental computer integrated manufacturing cell.

- Computer Modelling and Simulation

There are many Canadian industrial processes which can benefit from enhanced control strategies. This research area involves mathematical modelling and hence computer simulation of a broad range of processes and systems in order to achieve those benefits through interactive computer control in industry.

Facilities:

- Hybrid (digital/analog) computer
- Microprocessor development facility
- VAX 11/Series digital computers

WESTERN LABORATORY
(Vancouver, B.C.)

C. Dayson
Phone (604) 732-4477

Research Concentrations:

- Tribology

Friction, lubrication and wear studies are carried out on rail/wheel systems, and on fluid film lubrication of bearings, seals and gears. As well, tribological investigations of industrial problems are undertaken in response to particular requests.

. Applied Mechanics

Studies in applied mechanics are aimed at two specific targets. The first is the introduction to and acceptance by industry of state-of-the-art digital technology, both software and hardware. CAD/CAM system development

for NC applications and microprocessor innovations are examples. The second targeted research area is the development of mechanical technologies on a scale appropriate to the many small to medium size agricultural and forestry operations found in the Western Region.

Facilities:

- Surface characteristics assessment instrumentation
- Scanning Electron Microscope
- Friction and wear testing machines
- Lubricant test facilities
- 3-Axis continuous path machining centre
- Unigraphics CAD/CAM capability

FUELS AND LUBRICANTS LABORATORY

Dr. R.B. Whyte
Phone (613) 993-2415

Research Concentrations:

. Engine Fuels - Properties and Applications

With emphasis on road and rail transport modes, studies encompass analysis, experimentation and testing of alternate fuels and fuel cycles for internal combustion engines. Supporting work into the effect of these fuels on exhaust emissions is also carried out. As well, test are conducted on retrofit fuel economy devices for automobiles.

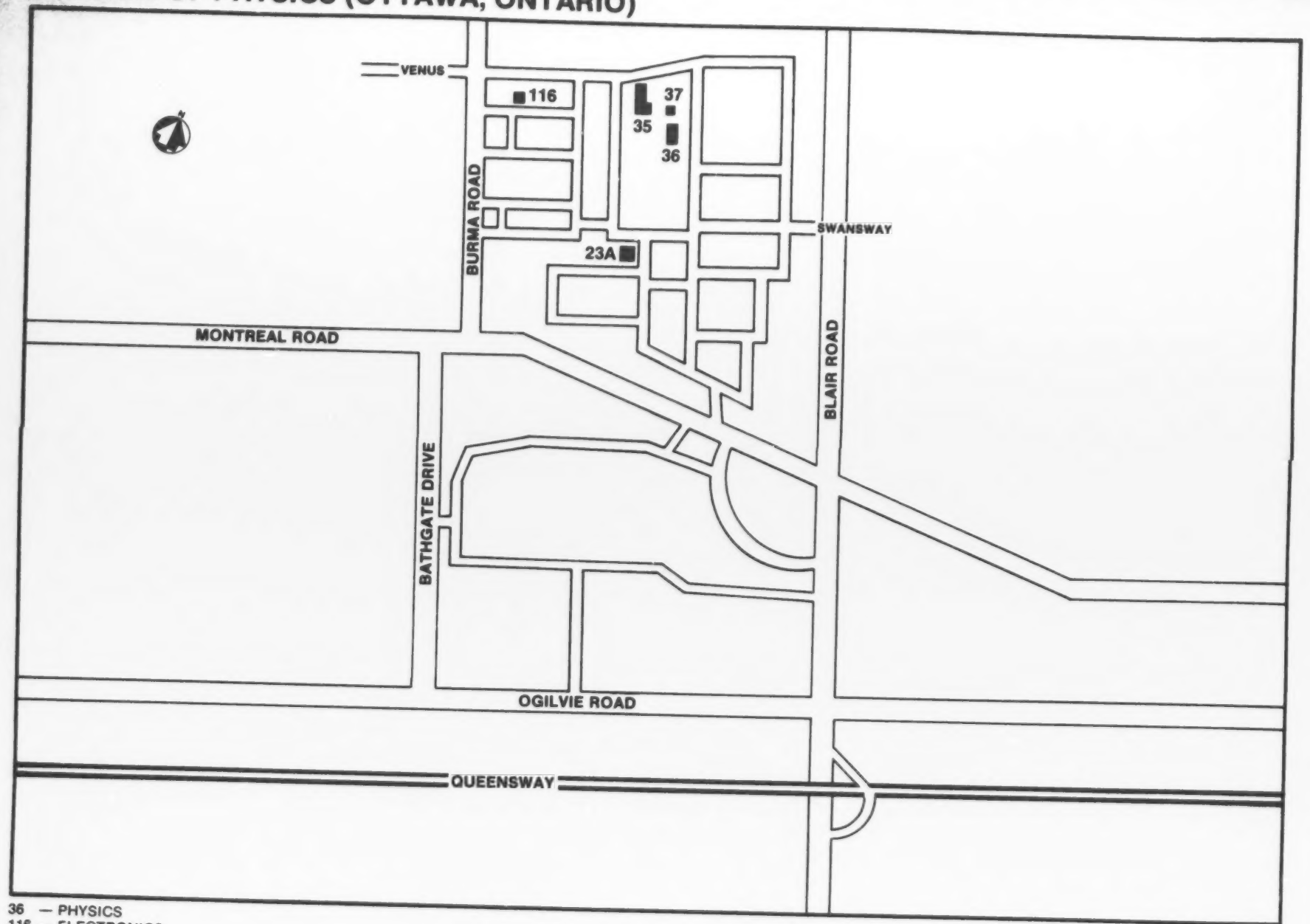
. Petroleum Products - Standards and Specifications

Work in this area maintains test methods, contributes to standards and specifications for petroleum products and enters into investigations which concern the public safety of these products.

Facilities:

- Gasoline and diesel fuel test engines
- Environmental test chambers
- Exhaust gas analysis
- Lubricant test and analysis facilities

DIVISION OF PHYSICS (OTTAWA, ONTARIO)



36 — PHYSICS
116 — ELECTRONICS
37 — ANECHOIC CHAMBER
23A — LASER AND PLASMA PHYSICS
35 — X-RAY AND NUCLEAR RADIATIONS

Division of Physics

DIRECTOR	Dr. P.A. Redhead	(613) 993-1208
ASSOCIATE DIRECTOR	Dr. H. Preston-Thomas	(613) 993-9192
ASSISTANT DIRECTOR	Dr. G. Wyszecki	(613) 993-2504
Industrial Project Coordinator	Mr. S.J. Jones	(613) 993-3235
ADMINISTRATIVE OFFICER	Mrs. J. Baker	(613) 993-2758

SECTION HEADS

Acoustics	E.A.G. Shaw	(613) 993-2840
Time Standards	C.C. Costain	(613) 993-1003
Electrical Standards	A.F. Dunn	(613) 993-2867
Heat and Thermometry	R.E. Bedford	(613) 993-2313
High Energy Physics	C.K. Hargrove	(613) 993-4711
Laser and Plasma Physics	A.J. Alcock	(613) 993-3016
Mechanical and Optical Physics	K.H. Hart	(613) 993-3326
Optics	G. Wyszecki	(613) 993-2504
Photogrammetry	Z. Jaksic	(613) 993-2074
Solid State Science	M.J. Laubitz	(613) 993-1053
X-Rays and Nuclear Radiations	K.W. Geiger	(613) 993-2197

ACOUSTICS

E.A.G. Shaw
Telephone (613) 993-2840

- Sound propagation outdoors
- External and middle ear acoustics
- Earphone measurement techniques and hearing studies
- Hearing conservation techniques
- Hand-arm vibration
- Effect of noise on sleeping persons
- Sound reproduction
- Acoustical data-processing
- Reduction of noise from small engines
- Sound level measurement techniques
- Acoustical standardization activities
- Primary acoustical standards.

ELECTRICAL AND TIME STANDARDS

Time Standards - C.C. Costain
Telephone (613) 993-1003
Electrical Standards - A.F. Dunn
Telephone (613) 993-2867

Electrical Standards

- dc standards
- rf and microwave standards
- Electrical instruments
- Reactance standards
- Josephson effect
- von Klitzing effect

Time Standards

- Cesium beam primary frequency standards
- Hydrogen maser standards
- Secondary frequency standards and time scales
- Time dissemination and CHU short wave station
- Frequency calibration facilities
- Satellite time transfer

HIGH ENERGY PHYSICS

C.K. Hargrove
Telephone (613) 993-4711

- Study of interactions of nuclei in emulsions
- Meson and baryon spectroscopy
- Instrumentation for particle physics
- Rare decays of muons and pions
- Opal e^+e^- collision at LEP

LASER AND PLASMA PHYSICS

A.J. Alcock
Telephone (613) 993-3016

- High power laser development
- Excimer laser studies
- Generation and detection of ultrashort laser pulses
- High power CO, laser-plasma interactions
- Laser-produced plasma diagnostics
- Numerical studies of laser-plasma interactions.

MECHANICAL AND OPTICAL PHYSICS

K.H. Hart
Telephone (613) 993-3326

- Primary length standards
- Primary mass standards
- Length and mass secondary standards and derived measurements
- Laser frequency stabilization and measurement
- Non-linear optical mixing
- Optical coatings and filters

OPTICS

G. Wyszecki
Telephone (613) 993-2504

- Photometric standards
- Colorimetric standards
- Performance characteristics of photoelectric receivers
- Spectrophotometry
- Spectroradiometry
- Absolute radiometry
- Reflectance standards
- Measurement of gloss
- Measurement of opacity
- Color-difference evaluations
- Color vision
- Performance of optical systems
- Holography and coherent optics
- Electro-optical devices
- Design of optical systems
- Calibration of aerial survey cameras
- Liquid crystals
- Sensitometry

PHOTOGRAMMETRIC RESEARCH

Z. Jaksic
Telephone (613) 993-2074

- Analytical on-line photogrammetry; analytical stereorestitutor
- Satellite photogrammetry
- Electronic photogrammetric control systems, automation
- Geodesic problems related to photogrammetry
- Analytical photogrammetry, computational programs
- Orthophoto and stereo-orthophoto technique
- Basic geometry of aerial photographs
- Non-cartographic photogrammetry
- Photogrammetric digital image processing

SOLID STATE SCIENCE

M.J. Laubitz
Telephone (613) 993-1053

- Calorimetry
- Electronic structure of metals and alloys
- Light scattering from surfaces
- Pressure effects on Fermi surfaces
- Transport properties of solid and liquid metals
- Electron-ion interactions in metals
- Many-body effects in one and two component plasmas
- Theory of cooperative phases in solids
- Ion and electron spectroscopy
- Mechanical properties of metals and alloys
- Mechanism of laser damage in solids
- Interactions of impurities and defects in insulating crystals
- Raman spectroscopy of solids

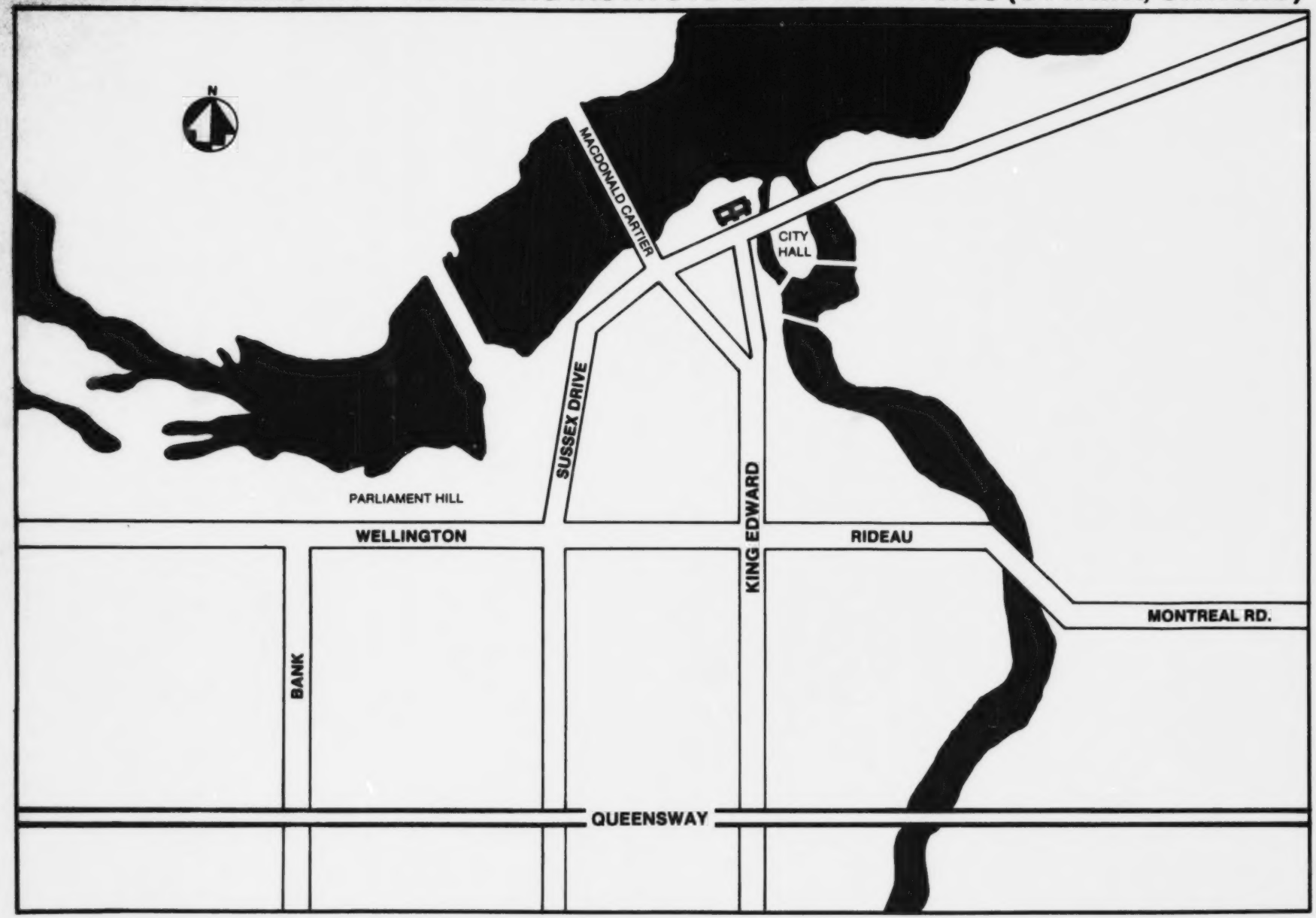
X-RAYS AND NUCLEAR RADIATIONS

K.W. Geiger
Telephone (613) 993-2197

- Radioactivity
- X- and y-ray exposure standards
- Absorbed dose calorimetry
- Radiation transport
- Chemical dosimetry

- 35 MeV electron linear accelerator:
  - Photoneutron measurements by time-of-flight
  - Radiation Physics
  - Bremsstrahlung spectral measurements
  - Radiation chemistry: pulse radiolysis
  - Chemical analysis by photon activation
- 4 MeV positive ion accelerator:
  - Neutron flux and dosimetry
  - Nuclear spectroscopy
  - Atomic effects: stopping power, photoelectric effect

DIVISION OF BIOLOGICAL SCIENCES • CANADA CENTRE FOR SPACE SCIENCE
DIVISION OF CHEMISTRY • HERZBERG INSTITUTE OF ASTROPHYSICS (OTTAWA, ONTARIO)



Herzberg Institute of Astrophysics

DIRECTOR	Mr. J.L. Locke	(613) 992-7686
ASSOCIATE DIRECTOR	Dr. I.B. McDiarmid	(613) 992-7884
ADMINISTRATIVE OFFICER	Mr. M.C. Storr	(613) 996-2984
SECTION HEADS		
Astronomy	Mr. N.W. Broten	(613) 593-6539
Dominion Astrophysical Observatory, Victoria	Dr. S. van den Bergh	(604) 388-3924
Dominion Radio Astrophysical Observatory, Penticton	Dr. L.A. Higgs	(604) 497-5321
Planetary Sciences	Dr. A.G. McNamara	(613) 992-6511
Space Physics	Dr. J.R. Burrows	(613) 992-2734
Spectroscopy	Dr. D.A. Ramsay	(613) 996-5309

ADDRESSES

The Herzberg Institute of Astrophysics
National Research Council of Canada
100 Sussex Drive
Ottawa, Ontario
K1A 0R6

The Dominion Astrophysical Observatory
Herzberg Institute of Astrophysics
5071 West Saanich Road
Victoria, B.C.
V8X 4M6

The Dominion Radio Astrophysical Observatory
Herzberg Institute of Astrophysics
National Research Council of Canada
P.O. Box 248
Penticton, B.C.
V2A 6K3

Addresses (continued)

Algonquin Radio Observatory
National Research Council of Canada
Lake Traverse, Ontario
K0A 2L0

Meteor Observation and Recovery Project
National Research Council of Canada
Physics Building
University of Saskatchewan
Saskatoon, Saskatchewan
S7N 0W0

DOMINION ASTROPHYSICAL OBSERVATORY

Dr. S. van den Bergh
Telephone (604) 388-3924

- maintains and operates, both as a national facility and for in-house research, an optical observatory with telescopes of 1.85, 1.22 and 0.41 m aperture and auxiliary equipment
- undertakes original research in the fields of
  - Galactic structure
  - peculiar A stars
  - dwarf novae and novae
  - infrared objects
  - late-type stars
  - photometry of stars and stellar systems
  - double stars
  - structure, evolution and distribution of star clusters
  - galactic supernova remanants
  - classification, surface photometry and evolution of galaxies
- develops techniques for the analysis of astronomical data
- develops instrumentation for astronomical research
- investigates designs for thin mirror telescopes
- investigates techniques for the testing of sites for optical observatories and supervises testing programs

DOMINION RADIO ASTROPHYSICAL OBSERVATORY

Dr. L.A. Higgs
Telephone (604) 497-5321

- maintains and operates, both as a national facility and for in-house research an observatory whose major instruments are:
  - a spectroscopic rotation synthesis radio telescope
  - a 26m parabolic telescope
  - a 22 mHz T-shaped array
- undertakes studies in the neutral hydrogen line, recombination lines and the continuum of such objects as
  - planetary nebulae
  - supernova remnants
  - high velocity interstellar clouds
  - Galactic structure
  - extragalactic radio sources

- makes routine measurements of the solar emission at a wavelength of 10.7 cm as a service to the international scientific community

- undertakes design studies for a proposed Canadian Long Baseline Array

ASTRONOMY SECTION

N.W. Broten
Telephone (613) 593-6539

- maintains and operates the Algonquin Radio Observatory, Lake Traverse, Ontario, as a national facility

- develops instrumentation for use on the 46 meter telescope of the Algonquin Radio Observatory

- undertakes original research using radio techniques in such fields as:

  - variable sources (quasars, Seyfert galaxies and BL Lac objects)
  - radio stars
  - mass exchange in binary systems
  - interstellar molecules and molecular clouds
  - recombination lines
  - HII regions
  - solar microwave emission

- uses techniques of long baseline interferometry to study structure of quasars and radio galaxies

- undertakes design studies for a proposed Canadian Long Baseline array

- undertakes studies of the fine-scale structure in the solar photosphere and chromosphere using observations taken at the Ottawa River Solar Observatory

- makes routine measurements of the solar emission at a wavelength of 10.7 cm as a service to the international scientific community

SPECTROSCOPY SECTION

Dr. D.A. Ramsay
Telephone (613) 996-5309

- undertakes studies of the spectra of molecules, free radicals and molecular ions in the microwave, infrared, visible, ultraviolet and vacuum ultraviolet regions

- studies the effects of electric and magnetic fields on molecular spectra

- investigates and interprets spectra of molecules of astrophysical interest

- develops spectroscopic techniques including

  - laser magnetic resonance spectroscopy
  - laser spectroscopy, with special emphasis on double photon spectroscopy
  - microwave-optical double resonance spectroscopy
  - saturated absorption spectroscopy
  - scanning infrared lasers
  - Fourier Transform Spectroscopy

- undertakes theoretical studies of the structure of molecules

SPACE PHYSICS SECTION

Dr. J.R. Burrows
Telephone (613) 992-2734

- using rockets and satellites undertakes studies of

  - magnetospheric plasmas and currents
  - plasma processes associated with auroral events
  - ionospheric currents

- investigates the modulation and isotropies of cosmic ray muons using a large array of proportional counters

- develops rocket and satellite borne instrumentation for

  - measurements of cosmic ray and solar particla fluxes
  - the mass spectroscopy of energetic ions
  - active experiments in the ionosphere

- operates a network of cosmic ray monitors with stations at Ottawa, Deep River, Goose Bay, Inuvik and Alert

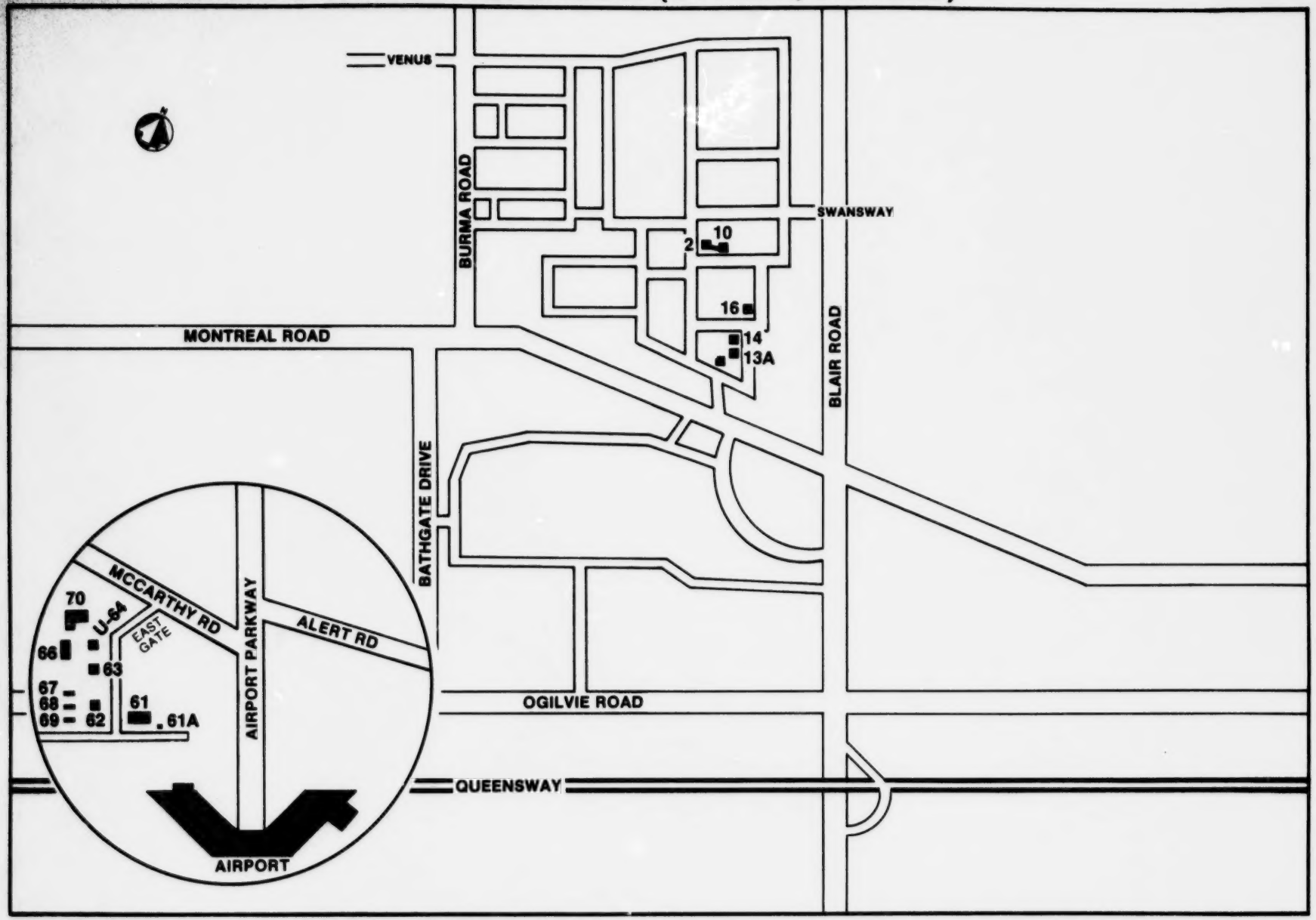
- undertakes theoretical investigations of electric currents in magnetospheric and ionospheric plasmas

PLANETARY SCIENCES SECTION

Dr. A.G. McNamara
Telephone (613) 992-6511

- investigates auroral phenomena using photographic, photometric, spectrographic, and radar techniques
- studies ionospheric and auroral plasmas using radio wave scattering techniques and rocket-borne probes
- maintains an auroral observatory at Churchill, Manitoba
- undertakes infrared studies of the airglow
- develops instrumentation for rocket and satellite borne experiments on auroral, ionospheric and magnetospheric phenomena
- operates the Meteorite Observation and Recovery Project, a network of semi-automatic camera stations in the Prairie Provinces for determining the trajectories of bright meteors
- studies meteor phenomena using visual, photographic, and spectroscopic, and radar observations

NATIONAL AERONAUTICAL ESTABLISHMENT (OTTAWA, ONTARIO)



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16	— PUBLICATIONS	61	— FLIGHT IMPACT SIMULATOR & FLIGHT RESEARCH HANGAR	70	— LOW SPEED AERODYNAMICS (WIND TUNNEL)
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		66	— HIGH SPEED AERODYNAMICS (WIND TUNNEL)	61A	— THRUST AUGMENTATION

National Aeronautical Establishment

DIRECTOR	Dr. G.M. Lindberg	(613) 993-2427
ASSISTANT DIRECTOR	Dr. K.H. Doetsch	(613) 993-2110
ADMINISTRATIVE OFFICER	Mrs. J.C. Robertson	(613) 993-2312
SECTION HEADS		
Low Speed Aerodynamics Laboratory	Mr. R.J. Templin	(613) 993-2423
High Speed Aerodynamics Laboratory	Mr. Lars Ohman	(613) 998-3243
Unsteady Aerodynamics	Dr. K.J. Orlik-Ruckemann	(613) 993-2395
Flight Research Laboratory	Dr. S.R.M. Sinclair	(613) 998-3071
Structures and Materials Laboratory	Dr. W. Wallace	(613) 993-2469
Public Safety Project Office	Mr. J.G. Arnold	(613) 993-3778
Teleoperator Project Office	Dr. K.H. Doetsch	(613) 993-1702 (613) 993-2110

LOW SPEED AERODYNAMICS LABORATORY

Mr. R.J. Templin
Telephone (613) 993-2423

- maintains and operates major national low speed wind tunnel facilities, including a 9m x 9m cross section V/STOL tunnel, a 2m x 3m tunnel and narrow smaller tunnels
- carries out commercial wind tunnel tests of models of aircraft, surface vehicles, buildings, bridges and other structures for industrial and other clients
- studies the technical aspects of wind energy conversion and cooperates in the industrial development of wind energy conversion systems
- pursues basic and applied research in the fields of
  - wind engineering
  - fluid flow instrumentation
  - wake vortices and wing body interactions
  - aerodynamics of wind turbines

HIGH SPEED AERODYNAMICS LABORATORY

Mr. Lars H. Ohman
Telephone (613) 998-3243

- maintains and operates a 1.5m x 1.5m trisonic wind tunnel as a national facility
- maintains and operates a 0.125m x 0.125m trisonic wind tunnel
- conducts commercial aerodynamic investigations for aerospace industries and agencies
- develops associated instrumentation, measuring techniques and data gathering and processing systems
- pursues basic and applied research in the fields of:
  - aerodynamics of wing and bodies in transonic flow
  - aerodynamics of high lift systems
  - viscous flow
  - computational fluid dynamics
  - buffet and flutter

UNSTEADY AERODYNAMICS LABORATORY

Dr. K.J. Orlik-Ruckemann
Telephone (613) 993-2395

- develops advanced techniques for oscillatory and rotary experiments in wind tunnels
- applies the techniques so developed for determining more complete sets of aircraft stability parameters
- examines the validity of presently used equations of aircraft motion and their sensitivity to the various stability parameters measured
- develops sensitive techniques for trace vapor detection, utilizing gas chromatography, vapor concentrators, vapor sources and passive samplers
- applies the techniques so developed for detection of illicit materials and hazardous chemicals such as explosives, narcotics, pesticides and UFFI
- examines the effect of meteorological conditions on pesticide spray application and deposition and recommends scenarios and techniques for optimum spraying operations

FLIGHT RESEARCH LABORATORY

Dr. S.R.M. Sinclair
Telephone (613) 998-3071

- operates a fleet of ten research aircraft
- conducts research in the general areas of aircraft flight systems and flight mechanics, atmospheric studies, aircraft operational problems, navigation and guidance systems, agricultural and forestry aviation, aeromagnetics
- maintains a core group of aeronautical engineers and engineering research pilots conversant with the classical disciplines and modern developments of the aeronautical sciences, sustaining this expertise through a program of in-house and collaborative research

STRUCTURES AND MATERIALS LABORATORY

Dr. W. Wallace
Telephone (613) 993-2469

INTRODUCTION

The Structures and Materials Laboratory provides assistance to the aerospace community in Canada in matters relating to the design, fabrication and structural integrity of aircraft and space structures.

STRUCTURES SECTION

- maintains facilities for structural testing of aerospace structures and components, including computer controlled flight-by-flight fatigue testing
- performs investigations on fatigue crack initiation and propagation in aerospace materials and components
- conducts investigations of in-flight loads in aircraft structures and analysis data to determine fatigue damage and residual safe life
- examines new techniques for detecting and monitoring damage in aircraft structural components
- maintains facilities and software for finite element analysis and finite difference analysis of structures
- develops and investigates the use of computer programs for structural analysis and the analysis of fatigue crack propagation in structures

APPLIED MECHANICS SECTION

- provides calibration services for force measuring instruments such as load cells and proving rings
- conducts investigations of the impact resistance of aircraft transparencies and leading edges
- performs characterization and processing studies on resins and fibres that are used in advanced fibre reinforced composites
- studies the effects of high intensity noise on aircraft and space structures
- conducts research on the recognition and synthesis of speech by machines

METALLIC MATERIALS SECTION

- maintains facilities for characterizing the microstructures, mechanical properties and corrosion properties of aerospace alloys

- conducts investigations on the strength, stability, fatigue, corrosion fatigue, stress corrosion and resistance to environmental degradation of aerospace alloys

- investigates new ways of processing aerospace alloys using hot isostatic pressing, isothermal forging, superplastic forming, powder processing, and related techniques

- provides services to the aerospace community in the failure analysis of engineering components and develops techniques for the analysis of fracture surfaces in engineering materials

ENGINEERING PHYSICS SECTION

- development of the Real Time Photogrammetry System - RPS, for the measurement of distance, velocity and orientation of remote objects

- investigates the use of RPS for the development of vision based control of industrial robots for automated inspection and handling of engineering components

- develops digital systems to support laboratory activities in the nondestructive examination of aerospace structures and materials

PUBLIC SAFETY PROJECT OFFICE

Mr. J.G. Arnold
Telephone (613) 993-3778

The Public Safety Project Office provides a focal point for all law enforcement research projects carried out at NRC. Through the Solicitor General of Canada, "A Canadian Program of Science and Technology in Support of Law Enforcement" has been established whereby the RCMP as Lead Agency and NRC as research performance closely cooperate to bring NRC's extensive scientific and technical capabilities to bear on problems facing the Canadian Police Community.

Current projects include:

- airborne lead
- latent fingerprint enhancement
- radio spectrum space allocation
- narcotics detection
- evaluation of equipment

TELEOPERATOR PROJECT OFFICE

Dr. K.H. Doetsch
Telephone (613) 993-1702 or 993-2110

NRC SPACE TECHNOLOGY PROGRAM

Space Shuttle Remote Manipulator System (CANADARM)

- Management of CANADARM project which provides for the design, development, test and evaluation of the first remote manipulator system for the NASA space shuttle orbiter.

Remote Manipulator System Technology Development

- Development of the technology associated with future space mechanisms and structures for the NASA space shuttle orbiter and other space platforms.

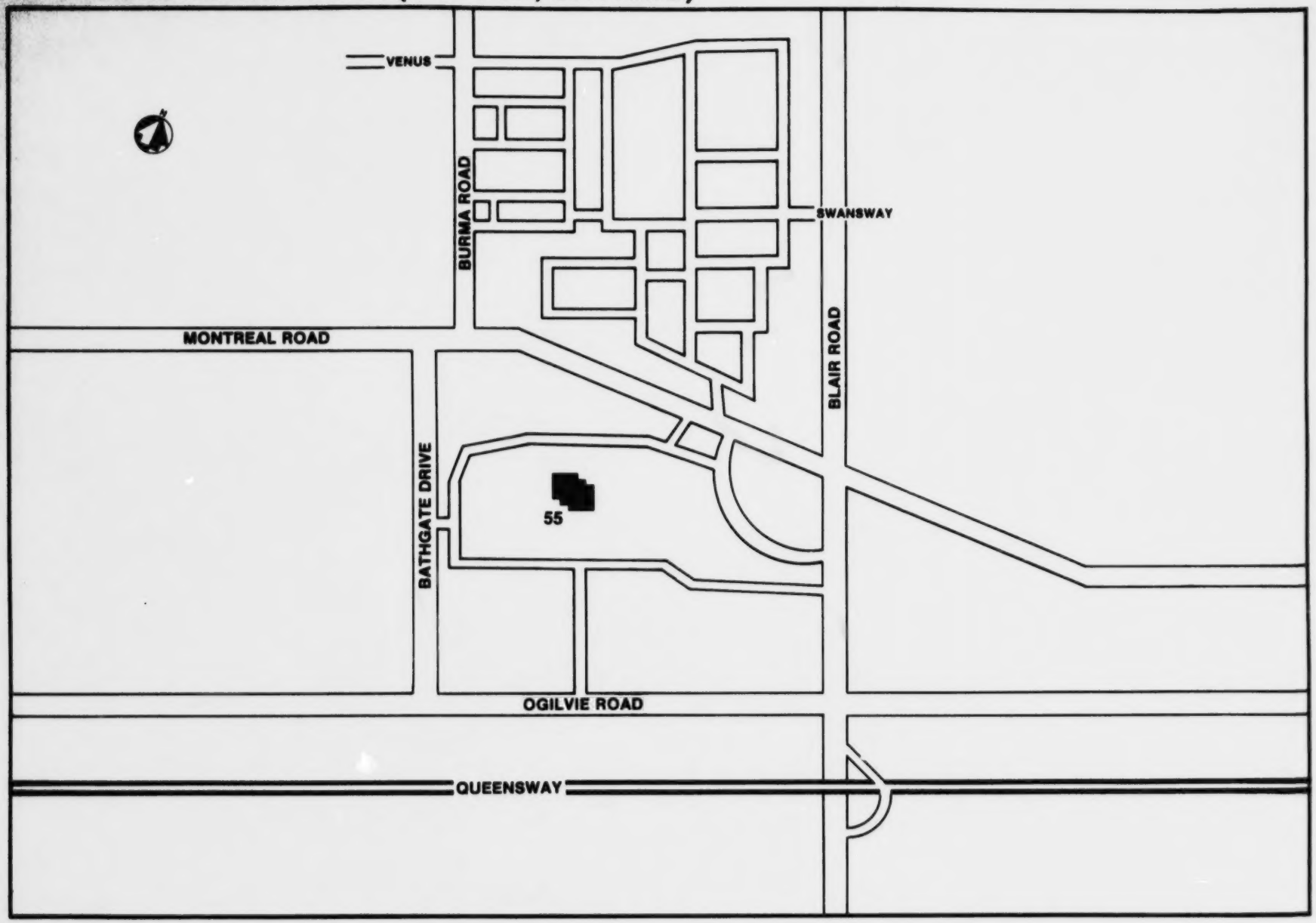
Experiment Involving a Canadian Astronaut

- Development for space use of a real-time optical position and motion measuring system which could be evaluated by a Canadian Astronaut flying on the NASA orbiter. The sensor would allow rendez-vous, grappling, docking and assembly tasks to be undertaken under automatic control.

Space Station Technology Development

- Development of Canadian uses for a permanent space station in low-earth orbit and development of the technology necessary for Canadian participation in the design and manufacture of some of the subsystems. The tasks to be undertaken from such a space station will include space construction, assembly, servicing, staging, refuelling, manufacturing, remote sensing, surveillance and scientific and technological investigations.

CANADA INSTITUTE FOR SCIENTIFIC AND TECHNICAL INFORMATION (OTTAWA, ONTARIO)



Canada Institute for Scientific and Technical Information

DIRECTOR	E.V. Smith	(613) 993-2341
ASSISTANT DIRECTOR	Mrs. I. Heseltine	(613) 993-3269
ADMINISTRATIVE OFFICER	M. Bergevin	(613) 993-1095
SECTION HEADS:		
Acquisitions	J. Parkkari	(613) 993-9958
Cataloguing	J. Green	(613) 993-2832
Union list of scientific serials	M. Kaiserman	(613) 993-3449
Document Delivery	J. MacGregor	(613) 993-2350
Canadian Index of Scientific Translations	M. Samson	(613) 993-3372
Circulation	C. Bruyère	(613) 993-1814
References	M. VanBuskirk	(613) 993-2013
Health Sciences Resource Centre	M. Schafer	(613) 993-1604
Canadian OnLine Enquiry (CAN/OLE)	B. Bullock	(613) 993-1210
Canadian Scientific Dissemination of Information (CAN/SDI)	B. Bullock	(613) 993-1210
Scientific Numeric Databases (CAN/SND)	G. Wood	(613) 993-3294
Publicity and Communications	F. Janson	(613) 993-3854
Information Exchange Centre	M. Gabe	(613) 993-1205
Publications	M. Gabe	(613) 993-3736
Translation	M. Racette	(613) 993-3369
Policy and Planning	M. Brandreth	(613) 993-3234
Systems Design	R. Noble	(613) 993-1321
Administration	M. Bergevin	(613) 993-1095

ACQUISITIONS SECTION

J. Parkkari
Telephone (613) 993-9958

- develops a knowledge of scientific and technological information requirements for the use of industrial, academic, and local research
- develops a knowledge of material published in all countries of the world relevant to science and technology, regardless of language or country of origin
- acquires material in the various forms of publication, such as periodicals, technical reports, monographs, treatises, etc. to form a collection for the use of the government and people of Canada, through the analysis of requests for loans and photocopies
- supports the activities of the scientists and engineers employed within the National Research Council of Canada by acquiring material for local use when it is current

CATALOGUING SECTION

Mrs. J. Green
Telephone (613) 993-2832

- catalogues books, serials, conference proceedings, technical reports and analytics, entering all records on an automated library system (DOBIS)
- assists users to find items they require from the collection from the online catalogue and the card catalogue covering earlier years
- produces a variety of output products from the online database including several publications, a microfiche backup catalogue and magnetic tapes for a CAN/OLE database

UNION LIST OF SCIENTIFIC SERIALS

Mrs. M. Kaiserman
Telephone (613) 993-3449

- maintains a list of scientific serials in libraries throughout Canada

DOCUMENT DELIVERY SECTION

Miss J. MacGregor
Telephone (613) 993-2350

- handles requests for book loans and photocopies of journal articles, etc. by providing them from CISTI's collection
- provides requesters with the location of items which are not available from CISTI
- maintenance of the collection including binding and repair; provision of a centralized microfiche service

CANADIAN INDEX OF SCIENTIFIC TRANSLATIONS

Miss M. Samson
Telephone (613) 993-3372

- maintains an index to translations of scientific literature and their locations throughout the world

CIRCULATION

C. Bruyère
Telephone (613) 993-1814

- provides inventory control for all items loaned by CISTI
- assists on-site users of CISTI's services by providing information on how to use the collection and other general information and directions
- provides document delivery services within NRC

REFERENCE SECTION

Ms. M. VanBuskirk
Telephone (613) 993-2013

- searches many online systems and a wide variety of library reference works to give answers to scientific and technical reference queries
- provides bibliographies (lists of literature references) in answer to requests
- refers requesters to scientific and technical experts

HEALTH SCIENCES RESOURCE CENTRE (HSRC)

Ms. M. Schafer
Telephone (613) 993-1604

- using online and manual techniques, provides reference and referral services in the field of health sciences
- acts as the Canadian centre for the network of MEDLARS users (from the U.S. National Library of Medicine)
- coordinates collection building activities among Canadian health science libraries and compiles health science directories

CANADIAN ONLINE ENQUIRY (CAN/OLE)

Ms. B. Bullock
Telephone (613) 993-1210

- develops and maintains an online system for information retrieval including many Canadian and general scientific and technical databases
- acts as the central code for nation-wide use of the CAN/OLE system including training users, documentation back-up and handling users' problems

CANADIAN SCIENTIFIC DISSEMINATION OF INFORMATION (CAN/SDI)

Ms. B. Bullock
Telephone (613) 993-1210

- provides individualized current awareness services for scientists and other users by computerized searching of current bibliographic databases at regular intervals
- search editors assist users to set up their individual current awareness profiles

SCIENTIFIC NUMERIC DATABASES (CAN/SND)

Dr. G. Wood
Telephone (613) 993-3294

- gives online access to critically evaluated scientific data including the ability to use computer programs to retrieve and perform calculations on the data
- currently available databases are in the fields of crystallography and infrared spectroscopy

PUBLICITY AND COMMUNICATIONS

Ms. F. Janson
Telephone (613) 993-3854

- responsible for CISTI's promotional activities including advertising, newsletters, annual report, brochures, exhibits, tours, new employee orientation
- provides advice and recommendations to Management on all activities which have an impact on CISTI's public relations

INFORMATION EXCHANGE CENTRE (IEC)

Ms. M. Gabe
Telephone (613) 993-1205

- collects information on federally supported research in Canadian universities for the IEC online database and an annual published directory
- produces a listing of the expertise of scientific researchers
- maintains the archival collection and records of publications in the NRC numbered series

PUBLICATIONS

Ms. M. Gabe
Telephone (613) 993-3736

- produces a variety of directories and informational publications about CISTI services
- maintains a depository of supplementary data (charts, tables, etc.) associated with published journal articles

TRANSLATION

M. Racette
Telephone (613) 993-3369

- provides translation services for the Scientific and Technical Information Program at NRC
- arranges translation of scientific articles, reports etc. originally published in many foreign languages as requested by NRC staff

POLICY AND PLANNING

M. Brandreth
Telephone (613) 993-3234

- studies and recommends on matters related to CISTI's policy as a Division of NRC and as a national institute for scientific and technical information
- develops and maintains liaison on informational programs with other organizations
- studies, manages and coordinates CISTI projects to improve existing services and introduce new ones
- monitors users' needs against changing organizational and national priorities

SYSTEMS DESIGN

R. Noble
Telephone (613) 993-1321

- designs, maintains and develops the computer programs for a variety of CISTI services
- performs production runs and updates for an online service (CAN/OLE) and a current awareness service (CAN/SDI)
- acts as a technical resource for all CISTI's automation projects and manages computer resources for CISTI applications

ADMINISTRATION

M. Bergevin
Telephone (613) 993-1095

- provides complete financial services for the Scientific and Technical Information (STI) Program including the preparation of the Operational Plan and the maintenance of financial control through continuing analysis and monitoring of financial activity

- responsible for the personnel activity for the STI program including recruiting, counselling, disciplinary action, staff transfers, promotions, terminations, and official NRC records for leave and attendance

- provides a centralized purchasing/supply/contracting service for the STI program as well as a shipping/receiving service for all Divisions located in Building M55 of NRC

- responsible for physical accommodation of the program staff plus staff of other Divisions in Building M55 including the provision of proper operations and continuing maintenance of building systems and facilities in the building

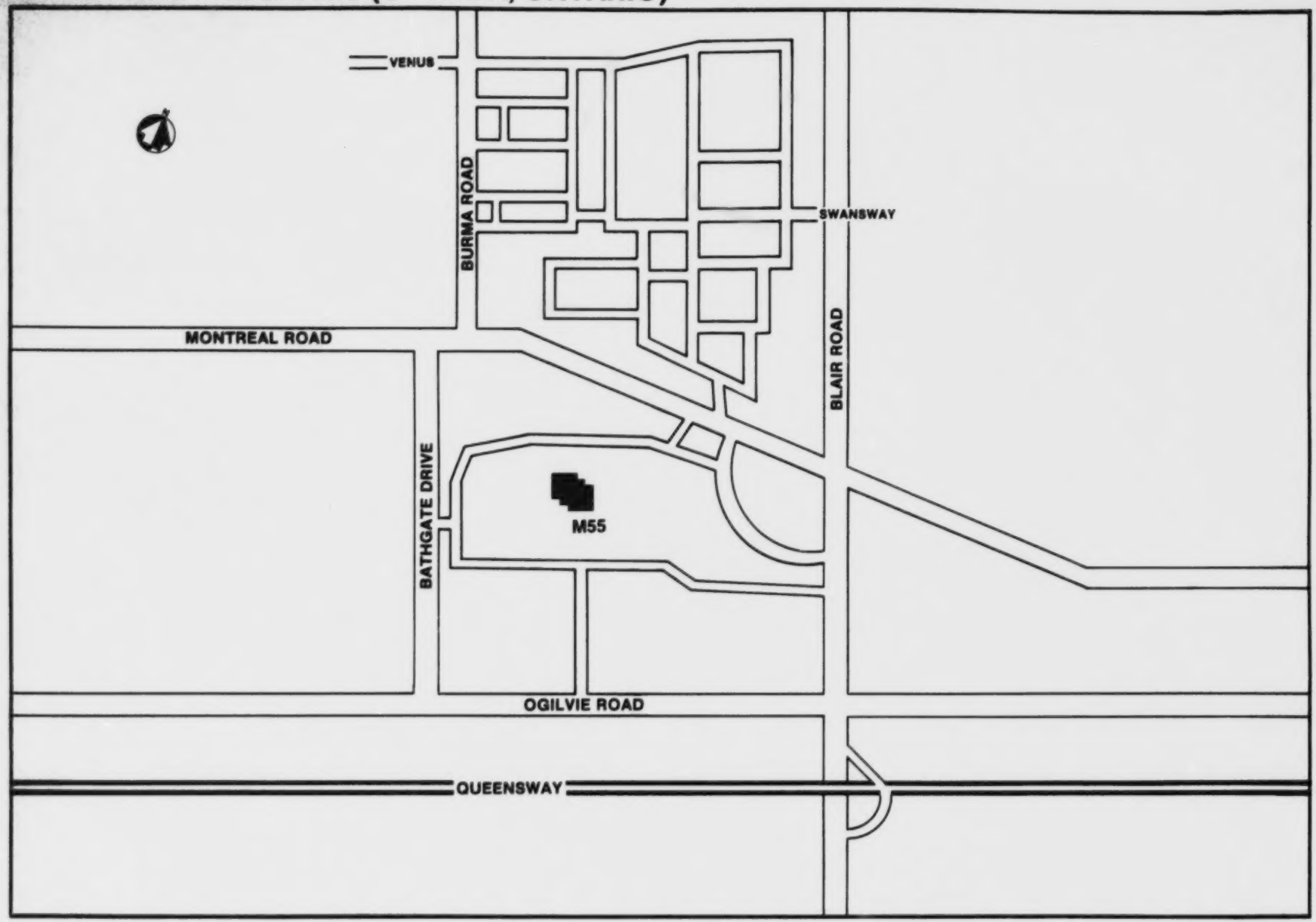
CISTI BRANCHES

Mrs. M. Hurley
Telephone (613) 993-9637

- provides a full range of information services in support of NRC laboratory activities. The twelve branches are Administration, Aeronautical/Mechanical Engineering, Building Research, Chemistry, Dominion Astrophysical Observatory, Dominion Radio Astrophysical Observatory, Electrical Engineering, Energy, Industrial Materials Research Institute, Physics, Sussex and Uplands

- three of the branches, Aeronautical/Mechanical Engineering, Building Research and Sussex, also provide national service from their unique resource collections

INDUSTRIAL PROGRAMS (OTTAWA, ONTARIO)



Industrial Programs

Vice-President (Industry)	Mr. K. Glegg	(613) 993-9186
Special Assistant	Mr. J.T. Faulkner	(613) 993-1266
Executive Manager, Industrial Development Office (IDO)	Dr. Wm.M. Coderre	(613) 993-0695
General Manager, Industry Policy Analysis (IPA)	Dr. S.S. Grimley	(613) 993-2002
General Manager, Program for Industry/Laboratory Projects (PILP)	Dr. J.R. Vose	(613) 993-1790
General Manager, Industrial Research Assistance Program (IRAP)	Mr. J.H. Braams	(613) 993-2012
Assistant General Manager, IRAP	Mr. H. Metcalfe	(613) 993-2012
Sector Specialist, IRAP	Mr. F. Bertrand	(613) 993-1753
Manager, Management Services	Mr. J.-F. Ceillier	(613) 993-0019

PROGRAM FOR INDUSTRY/LABORATORY PROJECTS (PILP)

Dr. John R. Vose
Phone (613) 993-1790

The PILP program offers Canadian industry the scientific know-how of research laboratories at the National Research Council and other science-based government departments. Technical assistance by government experts involves consultation, delivery of research data, training of company personnel, collaborative research or access to government laboratory facilities. One of the prerequisites for PILP support is that the Canadian company has sufficient technical and business capability to commercialize the results of suitable projects. The government's financial assistance is determined on a negotiated cost sharing basis. PILP will also contribute towards the cost of visiting the various laboratories when the companies are located at some distance from the laboratories.

The following is a list of PILP Project Managers at NRC and other government departments.

National Research Council:	Dr. Jim D. Robar	(993-0357)
	Mr. Brian N. Evans	(993-0357)
	Dr. J. Art Hunter	(993-0357)
	Mr. Gilles Dupont	(418)(694-4161)
	Mr. Doug Laurie-Lean	(993-0357)
Agriculture:	Dr. Jack R. Aitken	(995-7084)
Communications:	Mr. André Turgeon	(995-3004)
Energy, Mines and Resources:	Dr. W. Murray Strome	(995-1216)
	Dr. Wm.J.S. Craigen	(995-4911)
	Dr. Len S. Collett	(993-5964)
Environment:	Mr. Pat Fogarty	(997-2706)
Fisheries and Oceans:	Dr. Ian Pritchard	(996-1252)
	Mr. H. Graham Collins	(995-3966)
Health and Welfare:	Dr. Stewart Jackson	(996-3518)
National Defence:	Dr. H. Kenneth Clark	(992-5829)
Public Works:	Mr. Gordon Ala	(226-8410)
Transport:	Mr. Dave Hanchet	(514)(283-7680)

INDUSTRIAL RESEARCH ASSISTANCE PROGRAM (IRAP)

Mr. John H. Braams
Phone (613) 993-2012

The IRAP program encourages firms to undertake R&D leading to furthering the economic development of Canada. Through IRAP, the scientific and R&D management resources of federal government and other laboratories are brought to the support of industry. IRAP projects and activities assist firms of all sizes to tackle their technical problems and challenges.

The IRAP program consists of six elements and one sector specialist.

IRAP-C: Field Advisory Service
IRAP-F: Technical Information Service
IRAP-H: Contributions to Firms Employing Undergraduates
IRAP-L: Contributions to Laboratory Investigations
IRAP-M: Contributions to Small Projects
IRAP-P: Contributions to Large Projects

Sector Specialist: Machinery, Forest and Forest Products.

The IRAP elements are described in the following pages.

IRAP-C: FIELD ADVISORY SERVICE

Dr. R. Paquin
Phone (613) 993-1753

This service consists of representatives from Provincial Research Organizations and NRC employees located across Canada who provide information and guidance to companies on the solution of problems having technology as a major component. Also they help clients gain access to related types of assistance provided by NRC and other government departments.

The following is a list of IRAP Field Advisory contacts and representatives of Provincial Research Organizations.

St. John's (NRC) G. Cross	(709) 754-1937
St. John's (NLDC) R. Comerford	(709) 753-3560
Fredericton (NBRPC) R. Reid	(506) 455-8994
Dartmouth (NSRF) J. Helliwell	(902) 424-8670
Sydney (NSRF) D. Martel	(902) 564-5484 x 21
Quebec City (NRC) J. Falardeau	(418) 694-3419
Montreal (NRC) C. Brousseau	(514) 482-0651
Ottawa (NRC) J. McCorquodale	(613) 993-3995

Kingston (NRC) -	(613) 544-1537
Toronto (NRC) T. Torian	(416) 966-5845
Toronto (ORF) G. Sobering	(416) 822-4111 x 231
London (NRC) R.S. Carrigan	(519) 434-4314
Sudbury (NRC) J. Bardswich	(705) 674-0471
Winnipeg (NRC) G. Saunders	(204) 255-9610
Portage La Prairie (MRC) D. Fletcher	(204) 857-7861
Saskatoon (SRC) B. Zuk	(306) 664-5400
Edmonton (ARC) J.A. Holub	(403) 438-0666
Lethbridge (ARC) A. Opel	(403) 329-5414
Calgary (ARC) C. Harrison	(403) 282-9136
Vancouver (BCR) D. Mullan	(604) 224-4331

ACRONYMS:

NLDC - The Newfoundland and Labrador Development Corporation
NBRPC - New Brunswick Research and Productivity Council
NSRF - Nova Scotia Research Foundation Corporation
ORF - Ontario Research Foundation
MRC - Manitoba Research Council
SRC - Saskatchewan Research Council
ARC - Alberta Research Council
BCR - British Columbia Research

IRAP-F: TECHNICAL INFORMATION SERVICE

Dr. D. Cox
Phone (613) 993-1753

This service is to help clients solve their technical and engineering problems by finding out solutions to their queries. It is particularly useful to small and medium sized companies with limited technical library facilities, engineering or research staff.

The Technical Officers of this service are:

- Adhesive, Paint & Textile Technology
  P. Kizas
  M. Zevy

- Chemical Engineering
  W. T. Ross
  D.H.Ll. Thomas

- Electronic & Electrical Engineering
  C. Muirhead

- Energy Technology
  G. Mager

- Food Technology
  J. Jaffray
  Dr. H.J. Lips

- Mechanical Engineering
  K.W. Noble
  Z.A. Navratil

- Manufacturing & Materials Engineering
  J. Chander

- Metallurgical Engineering & Materials Science
  Dr. R. Osadchuk

- Plastics & Rubber Technology
  A.B. Cann
  Dr. S.N. Khanna

- Technological Awareness Analysis
  J.E. Cunningham (993-1190)
  D. Landel (993-1190)

IRAP-L: CONTRIBUTIONS TO LABORATORY INVESTIGATIONS

Dr. R. Paquin
Phone (613) 993-1753

This element helps small industry (up to 200 employees) fund investigations conducted by research laboratories, institutes or consulting services. Assistance is limited to a maximum of $6,000 per project with a limit of three projects per company per year. The Field Advisory Officers and representatives of the Provincial Research Organizations are responsible for delivery of this program (See IRAP-C).

IRAP-H: CONTRIBUTIONS TO FIRMS EMPLOYING UNDERGRADUATES

Dr. R. Paquin
Phone (613) 993-1753

This element of IRAP pays a substantial portion of the salaries of university and technical college students who aid small firms with problems related to production, manufacturing and preparation of product designs, quality control and plant layout. Students work under the supervision of the Field Advisory Officers (See IRAP-C).

IRAP-M: CONTRIBUTIONS TO SMALL PROJECTS

Mr. G.H. Fraser
Phone (613) 993-0331

This element is designed to encourage small companies (up to 200 employees) with limited or no technical staff to solve specific technical problems with their own staff and/or with the aid of external facilities in a selected research organization. Financial assistance covers salaries and fringe benefits of professionals and technicians working on the approved project, as well as employees under subcontract to cooperating research organizations.

The IRAP-M Project Managers are: Mr. A.A. DeLuca
Mr. J. Bradshaw
Mr. K. Bell
Mr. E. Bellem

IRAP-P: CONTRIBUTIONS TO LARGE PROJECTS

Dr. D.G.T. Cooper
Phone (613) 993-0331

This program serves to increase or extend the calibre and scope of industrial research in Canada in situations where it leads to high business effectiveness. The financial assistance covers both salaries and fringe benefits paid to the participating company's scientific and technical staff engaged in the project and, if required, the participation of university professors or consultants associated with the project.

The IRAP-P Project Managers are: Mr. E. Bellem
Mr. K. Bell
Mr. A. DeLuca
Mr. J. Bradshaw

SECTOR SPECIALIST

Mr. F. Bertrand
Phone (613) 993-1753

This sectoral specific IRAP service focuses on machinery research and development in the forestry and related industries with special emphasis on the particular needs of the Province of Quebec. The services and program mechanisms of all the other IRAP elements are available as resources in support of this sector.

INDUSTRY POLICY AND ANALYSIS OFFICE

Dr. Slater S. Grimley
Phone (613) 993-2002

The IPA is a staff unit serving the Vice-President (Industry). As such, a considerable part of IPA's activity necessarily relates to concerns of the IDO Executive Manager and the IRAP and PILP Offices. Other activities derive from the wider responsibilities of the Vice-President (Industry) related to other NRC industrial concerns, other government departments, etc. The IPA is a relatively new group and its role is still evolving. The present permanent staff is 4; temporary additions are made occasionally.

The work of the IPA breaks down roughly into four main headings:

1. Industry Analysis (Reviews, studies, reports, etc. are made of industry segments of interest to NRC. Topics include characteristics, growth, R&D activity, productivity, distributions, domestic and international comparisons, analysis of impacts of present and proposed activities of NRC, other Government departments or foreign countries. Work is often in collaboration with other groups.)

2. IDO Program Studies (A study has been made, and is continuing, of the results of the IRAP program. The IPA also assists the PILP Interdepartmental Committee and ACCETT, an NRC Advisory Committee on Engineering Technology Transfer.)

3. IDO Issues Analysis (Discussion papers are written to aid IDO policy decisions. Topics have included regional distribution, confidentiality of industry information "incrementality", megaprojects, export/import trends, federal budget commentaries, etc.)

4. Industry Seminars (Invited speakers make presentations on matters of concern in industry.)

IPA staff maintain contacts with other government departments and with national and international specialists concerned with the impact of technology on business and economics. The IPA collates statistics in this field and contributes papers to appropriate journals to give NRC a profile in this area.

Staff

Project Managers:	B.G. Cameron	(993-3899)
	J.E. Fisher	(993-1090)

INDEX

PART I
Research Activities

INDEX

PART I: RESEARCH ACTIVITIES
PART II: FACILITIES AND SERVICES

ABBREVIATIONS

Aero	National Aeronautical Establishment
Arctic	Arctic Vessel and Marine Research Institute
Astro	Herzberg Institute of Astrophysics
Atlantic	Atlantic Research Laboratory
Bio Sci	Division of Biological Sciences
Bldg Res	Division of Building Research
Chem	Division of Chemistry
Elec Eng	Division of Electrical Engineering
Energy	Division of Energy
Indust Mat	Industrial Materials Research Institute
Ind Res	Industry Development Office
IRAP	Industrial Research Assistance Program
Mech Eng	Division of Mechanical Engineering
Physics	Division of Physics
PILP	Program for Industry/Laboratory Projects
Plant Bio	Plant Biotechnology Institute
Sci Info	Canada Institute for Scientific and Technical Information
Spa Sci	Canada Centre for Space Science
MRL	Montreal Road Laboratories, Ottawa
Sussex	Sussex Drive Laboratories, Ottawa

Keyword	Description	Where work is done	Contact	Telephone
ACCELERATORS:ELECTRON	Electron linear acceleration	Physics; X-rays and Nuclear Radiations	W.F. Davidson	(613) 993-2197
ACCELERATORS:PARTICLE	Positive ion acceleration	Physics; X-rays and Nuclear Radiations	K.W. Geiger	(613) 993-2197
ACETYLENIC CHEMISTRY	Acetylenic synthesis	PlantBio; Chemistry	S.R. Abrams	(306) 665-5258
ACOUSTIC ANALYSIS	Pulp analysis using acoustic resonance and diffraction	Indust. Mat.: Instruments and Systems Section	P. Cielo	(514) 641-2280
ACOUSTIC MICROSCOPY	----------	Indust. Mat.: Instruments and Systems Section at the University of Sherbrooke	M. Poirier	(519) 565-3576
ACOUSTICAL PERFORMANCE:BUILDINGS	Propagation of sound in and around buildings	BldgRes; Noise and Vibration	R.E. Halliwell	(613) 993-2305
ACOUSTICAL PERFORMANCE: BUILDINGS	Measurements of acoustical performance of building elements and materials	BldgRes; Noise and Vibration	A.C.C. Warnock	(613) 993-2305
ACOUSTICAL STANDARDS	Microphone calibration - sound level measurements	Physics; Acoustics	G.K. Wong	(613) 993-2840
ACOUSTICS:AIRCRAFT AND SPACECRAFT	Acoustic effects on aircraft and spacecraft	Aero; Structures and Materials	R. Westley	(613) 998-3408
ACOUSTICS:AIRCRAFT NOISE	----------	Physics; Acoustics	J.E. Piercy	(613) 993-2840
ACOUSTICS:HUMAN ENGINEERING	Ear studies; earphone calibration; hearing measurement and conservation; noise and sleep	Physics; Acoustics	E.A.G. Shaw	(613) 993-2840

Keyword	Description	Where work is done	Contact	Telephone
ACOUSTICS:SOUND PROPAGATION	----------	Physics; Acoustics	J.E. Piercy	(613) 993-2840
ACOUSTICS:SOUND REPRODUCTION	Evaluation of loudspeakers - studies of human judgment in sound quality	Physics; Acoustics	F. Toole	(613) 993-2840
ACOUSTICS:VEHICLE NOISE	----------	Physics; Acoustics	T.F.W. Embleton	(613) 993-2840
AERIAL REFORESTATION	Forest aviation; spray drift	Aero; Flight Research; Unsteady Aerodynamics	M. Sinclair R.S. Crabbe	(613) 998-3071 993-2521
AERIAL SPRAYING	Agricultural aviation; spray distribution	Aero; Flight Research	A.M. Drummond	(613) 998-3567
AEROACOUSTICS	Acoustic effects on aircraft and spacecraft	Aero; Structures and Materials	R. Westley	(613) 998-3408
AERODYNAMICS: AEROELASTICITY	Buffet and flutter test and analysis	Aero; High Speed Aerodynamics	B.H.K. Lee	(613) 998-3401
AERODYNAMICS:AIRCRAFT	Aerodynamics of airborne vehicles	Aero; High Speed Aerodynamics, Low Speed Aerodynamics	L.H. Ohman R.J. Templin	(613) 998-3243 (613) 993-2423
AERODYNAMICS:AIRCRAFT LIFE	Operating loads and life of aircraft	Aero; Structures and Materials	G. Campbell	(613) 993-0177
AERODYNAMICS:AIRCRAFT STABILITY	Stability of aircraft	Aero; Unsteady Aerodynamics	K. Orlik-Ruckemann	(613) 993-2395
AERODYNAMICS:COMPOSITE MATERIALS AND STRUCTURES	Glass, kevlar, graphite fibre reinforced laminates, fibre reinforced composite materials	Aero; Structures and Materials	R. Wallace	(613) 993-2469

Keyword	Description	Where work is done	Contact	Telephone
AERODYNAMICS:COMPUTER MODELLING	Computation fluid dynamics	Aero; High Speed Aerodynamics	D. Jones	(613) 998-3545
AERODYNAMICS:DUCTING	Aerodynamics of industrial ducting	MechEng; Gas Dynamics	R.A. Tyler	(613) 993-2442
AERODYNAMICS:FLIGHT INVESTIGATIONS	Flight, aerodynamic, structural and materials investigations for aircraft industry	Aero; Structures and Materials	W. Wallace	(613) 993-2469
		Flight Research	M. Sinclair	998-3071
		High Speed Aerodynamics	L.H. Ohman	998-3243
		Low Speed Aerodynamics	R.J. Templin	993-2423
AERODYNAMICS:FLIGHT MECHANICS	Augmentor wing, V/STOL, techniques and requirements for controlling aircraft	Aero; Flight Research	M. Morgan	(613) 998-3006
AERODYNAMICS:HIGH LIFT WINGS	High lift wing systems	Aero; High Speed Aerodynamics	D. Brown	(613) 998-3426
			Y.Y. Chan	(613) 998-3263
AERODYNAMICS:METAL FATIGUE	Fatigue and damage tolerance of structures	Aero; Structures and Materials	D.L. Simpson	(613) 993-0899
AERODYNAMICS:NAVIGATION SYSTEMS	Aircraft navigation systems Kalman Filters	Aero; Flight Research	C.D. Hardwick	(613) 998-3525
AERODYNAMICS:STRUCTURAL ANALYSIS	Finite element analysis, damage tolerance analysis	Aero; Structures and Materials	J.P. Kacprzynski	(613) 993-0289
AERODYNAMICS:TRANSONIC AIRCRAFT	High lift wing systems	Aero; High Speed Aerodynamics	D. Brown	(613) 998-3426
			Y.Y. Chan	(613) 998-3263

Keyword	Description	Where work is done	Contact	Telephone
AERODYNAMICS:TRUCKS	Energy efficiency in the transportation system - truck aerodynamic drag	MechEng; Engine	H.S. Fowler	(613) 993-2425
AERODYNAMICS:WING FLUTTER	Buffet and flutter test and analysis	Aero; High Speed Aerodynamics	B.H.K. Lee	(613) 998-3401
AEROMAGNETICS	Magnetic anomaly detection magnetometers, gradiometers	Aero; Flight Research	C.D. Hardwick	(613) 998-3525
AEROSPACE:METALLIC MATERIALS	Hot isostatic pressing, characterization and processing of aerospace alloys	Aero; Structures and Materials	J.P. Immarigeon	(613) 993-9280
AEROSPACE:STRUCTURES AND MATERIALS	Flight, aerodynamic, structural and materials investigations for aircraft industry	Aero; Structures and Materials Flight Research High Speed Aerodynamics Low Speed Aerodynamics	 W. Wallace M. Sinclair L.H. Ohman R.J. Templin	(613) 993-2469 998-3071 998-3243 993-2423
AGGLOMERATION	Technology transfer; field testing of membrane and agglomeration technology	Chem; Chemical Engineering, MRL	C.E. Capes	(613) 993-2455
AGGLOMERATION	Chemical engineering	Chem; Chemical Engineering, MRL	C.E. Capes	(613) 993-2455
AGGLOMERATION:COAL	Coal beneficiation	Chem; Chemical Engineering, MRL	C.E. Capes	(613) 993-2455
AGRICULTURE:AERIAL SPRAYING	Agricultural aviation; spray distribution	Aero; Flight Research	A.M. Drummond	(613) 998-3567

Keyword	Description	Where work is done	Contact	Telephone
AGRICULTURE:FERNS	Research in support of agriculture: effect of fungal toxins on growth of ruminants; ecology and chemistry of lichens and sphagnum mosses; development of the ostrich fern as an agronomic crop	Atlantic; Marine Plant Ecology - Lichenology - Microbiology	P. von Aderkas W. Maass A. Taylor	(902) 426-8273 426-8286 426-8289
AGRICULTURE: PRODUCTIVITY	Nitrogen fixation - bacterial studies	PlantBio; Microbial	L.M. Nelson	(306) 665-5243
AGRICULTURE: PRODUCTIVITY	Nitrogen fixation - plant studies; physiological evaluation for crop productivity	PlantBio; Microbial	J.D. Mahon	(306) 665-5252
AGRICULTURE:RUMINANTS	Research in support of agriculture: effect of fungal toxins on growth of ruminants; ecology and chemistry of lichens and sphagnum mosses; development of the ostrich fern as an agronomic crop	Atlantic; Marine Plant Ecology - Lichenology - Microbiology	P. von Aderkas W. Maass A. Taylor	(902) 426-8273 426-8286 426-8289
AGRICULTURE:THERAPEUTIC AGENTS	Synthesis of substances useful in medicine and agriculture	Chem; Organic Chemistry, Sussex	O.E. Edwards	(613) 992-4092
AIR CUSHION HOSPITAL BEDS	Hospital bed	MechEng; Engine	E. Schaub	(613) 993-9235
AIR CUSHION VEHICLES	Air cushion technology - stability and skirt drag	MechEng; Engine	H.S. Fowler	(613) 993-2425
AIR CUSHION VEHICLES	Air cushion technology - heavy transporters, ferries, ice breaking	MechEng; Engine	H.S. Fowler	(613) 993-2425
AIR CUSHION:HOSPITAL BED	Hospital air bed	MechEng; Engine	H.S. Fowler	(613) 993-2425

Keyword	Description	Where work is done	Contact	Telephone
AIR INFILTRATION:BUILDINGS	Air infiltration in residential buildings	BldgRes; Prairie	R.S. Dumont	(306) 665-4204
AIR QUALITY:INDOOR	Formaldehyde out-gassing problems	BldgRes; Building Performance	D. Walkinshaw	(613) 993-1231
AIR QUALITY:INDOOR	Ventilation and air quality	BldgRes; Energy and Services	G.T. Tamura	(613) 993-9580
AIRBORNE SENSORS	Aircraft research instrumentation, avionics and sensor subsystems	Aero; Flight Research	D.F. Daw B.W. Leach	(613) 998-3313 998-3149
AIRCRAFT ACCIDENT INVESTIGATION	Aircraft accident investigation: fuel	MechEng; Fuels and Lubricants	R.B. Whyte	(613) 993-2415
AIRCRAFT INCIDENTS	Aircraft operational problems	Aero; Flight Research	B. Calger	(613) 998-3149
AIRCRAFT NOISE	----------	Physics; Acoustics	J.E. Piercy	(613) 993-2840
AIRCRAFT STRUCTURES	Fatigue and damage tolerance of structures	Aero; Structures and Materials	D.L. Simpson	(613) 993-0899
AIRCRAFT:BIRD IMPACT	Flight impact studies	Aero; Structures and Materials	G.R. Cowper	(613) 993-2794
ALKALOIDS:PLANT CELL	Alkaloid production from plant cell cultures	PlantBio; Biotechnology	W.G.W. Kurz	(306) 665-5278
AMINO ACID CHEMISTRY	Amino acid analyses	PlantBio; Chemistry	S.L. MacKenzie	(306) 665-5257
AMORPHOUS ALLOYS:PRODUCTION	Manufacturing and characterizing amorphous alloys obtained by a rapid solidification	Indust. Mat. Instruments and Systems Section	H. LeHuy	(514) 641-2280

Keyword	Description	Where work is done	Contact	Telephone
ANALYTICAL CHEMISTRY	Development of new analytical methods	Chem; Analytical Chemistry, MRL	S. Berman	(613) 993-2043
ANALYTICAL CHEMISTRY: SERVICES	Provision of analytical services	Chem; Analytical Chemistry, MRL	S. Berman	(613) 993-2043
ANTENNAS	Studies of electromagnetic and antenna theory through the development and application of mathematical techniques	ElecEng; Electromagnetic Engineering	R.A. Hurd	(613) 993-9074
ANTENNAS	Application of electromagnetic engineering principles for the design and development of antenna and radiating systems	ElecEng; Electromagnetic Engineering	W. Lavrench	(613) 993-1268
ANTIGENS: SYNTHETIC	Synthetic antigens from carbohydrates	BioSci; Microbiology and Immunochemistry, Sussex	H.J. Jennings	(513) 992-5729
ANTIOXIDANTS: BIOLOGICAL	Chemical biology	Chem; Hydrocarbon Chemistry, Sussex	K.U. Ingold	(613) 992-3335
APERTURE SYNTHESIS	Earth Rotation Synthesis Mapping	Astro; Dominion Radio Astrophysical Observatory	P.E. Dewdney	(604) 497-5321
AQUACULTURE	Ecology, taxonomy and genetics of marine plants; isolation of biologically active compounds from marine organisms; development of aquaculture systems	Atlantic; Marine Plant Ecology - Marine Plant Biochemistry - Marine Plant Chemistry - Marine Plant Genetics	 J. McLachlan J. Craigie J. Wright J. van der Meer	(902) 426-8274 426-8287 426-8275 426-8276

Keyword	Description	Where work is done	Contact	Telephone
AQUATIC ECOSYSTEMS	Biology and physiology of freshwater vascular plants	BioSci; Ecotoxicology, Tunney's Pasture	D.R. Miller	(613) 593-6912
AQUATIC ECOSYSTEMS	Formulation and validation of mathematical models of pollutants movement in aquatic ecosystems	BioSci; Ecotoxicology, Tunney's Pasture	D.R. Miller	(613) 593-6912
ARCTIC CONDITIONS:OCEAN PLATFORMS	Model studies of wind, wave and ice induced forces and moments on platforms, their stability and towing characteristics	Arctic; Research	M. Michailidis	(613) 993-2288
ARCTIC MARINE TRANSPORTATION	Study of ship/ice interaction. Evaluation of special hull and propulsion system designs for ice-transiting vessels and protection of their propellers in ice.	Arctic; Research	M. Michailidis	(613) 993-2288
ARCTIC MARINE TRANSPORTATION	Research and development of cable fairings, navigational aids, etc.	Arctic; Research	M. Michailidis	(613) 993-2288
ARCTIC MARINE TRANSPORTATION	Design and model and full scale performance evaluation of icebreakers and ice-transiting vessels	Arctic; Research	M. Michailidis	(613) 993-2288
ARCTIC RESEARCH:DEVELOPMENT OF TEST FACILITIES	Facilities and equipment design for a national facility for arctic vessel and marine research	Arctic; Systems	D. Gospodnetic	(613) 993-2288
ASTRONOMICAL OBSERVATORIES:SITE SELECTION	----------	Astro; Dominion Astrophysical Observatory	E.B.F. Brosterhus	(604) 388-3960

Keyword	Description	Where work is done	Contact	Telephone
ATMOSPHERIC CHEMISTRY	Chemical reactions of atmospheric interest	Chem; Kinetics & Catalysis, MRL	J.R. Morton	(613) 993-2372
ATMOSPHERIC STUDIES	Cloud physics, air quality, atmospheric, turbulence	Aero; Flight Research	J.I. MacPherson	(613) 998-3594
ATOMIC ABSORPTION & EMISSION:ORGANIC MOLECULES	Physical and chemical instrumental analyses on the structure of organic molecules. Research directed at understanding of hydrogen bonding; use of isotope labelling, fabrication of special probes; development of analytical techniques and procedures	Atlantic; Analytical Chemistry	R. Guevremont	(902) 426-8280
AURORAL STUDIES	----------	Astro; Space Physics, Sussex	B.A. Whalen A.W. Yau	(613) 992-2734
AURORAL STUDIES	Investigation of upper atmospheric and magnetospheric phenomena	SpaSci; Ottawa	G. Atkinson	(613) 992-0304
AURORAL STUDIES	----------	Astro; Planetary Sciences, Sussex	A.V. Jones	(613) 996-9345
AVALANCHE ENGINEERING	Techniques and criteria for evaluation of avalanche hazards	BldgRes; West	P.A. Schaerer	(604) 542-4829
AVALANCHE ENGINEERING	Location, design and maintenance of engineering works and developments in avalanche areas	BldgRes; West	P.A. Schaerer	(604) 542-4829
AVIONICS	Aircraft research instrumentation, avionics and sensor subsystems	Aero; Flight Research	D.F. Daw B.W. Leach	(613) 998-3313 998-3149

Keyword	Description	Where work is done	Contact	Telephone
BACTERIA:NITROGEN FIXATION	Nitrogen fixation - bacterial studies	PlantBio; Microbial	L.M. Nelson	(306) 665-5243
BARYONS	----------	Physics; High Energy Physics	M.J. Losty	(613) 993-4711
BEARINGS:FLUID FILM	Fluid film bearings	MechEng; Engine	H.S. Fowler	(613) 993-2425
BINARY STARS	----------	Astro; Dominion Astrophysical Observatory	J.B. Hutchings	(604) 388-3909
BIOCHEMISTRY: ANTIOXIDANTS	Chemical biology	Chem; Hydrocarbon Chemistry, Sussex	K.U. Ingold	(613) 992-3335
BIOLOGICAL MEMBRANES	Properties of biological materials	Chem; Molecular Spectroscopy, Sussex	H.H. Mantsch	(613) 992-4769
BIOMASS:CONVERSION	Biogas; thermal chemistry industrial chemicals	BioSci; Biofuels Energy; Bioenergy Contractors	L. van den Berg W.M.L. Morisset	(613) 993-3310 993-1342
BIOMASS:LIQUID FUELS	Ethanol	BioSci; Biofuels Energy; Bioenergy	L. van den Berg W.M.L. Morisset	(613) 993-3310 993-1342
BIOMASS:PRODUCTION	Biotechnology; silviculture	Energy; Bioenergy Contractors	R. Overend	(613) 993-1342
BIOMATHEMATICS	Solution stability	Chem; Theoretical Chemistry, Sussex	W. Siebrand	(613) 992-6808
BIOMATHEMATICS	Biometric analysis	BioSci; Biomathematics, Sussex	D.R. Miller	(613) 593-6912

Keyword	Description	Where work is done	Contact	Telephone
BOSONS	----------	Physics; High Energy Physics	M.J. Losty	(613) 993-4711
BREAKWATERS	Stability of breakwaters	MechEng; Hydraulics	J. Ploeg	(613) 993-2417
BRICKS:DURABILITY	Durability of structural clay products	BldgRes; Building Materials	J.H.I. Kung	(613) 993-1596
BUILDING CONSTRUCTION:PRAIRIES	Design details and construction techniques in major buildings in the Prairies	BldgRes; Prairie	M.E. Lux	(306) 665-4201
BUILDING DESIGN	Design-construction process	BldgRes; Building Performance	K.N. Burn	(613) 993-1231
BUILDING DESIGN:PRAIRIES	Design details and construction techniques in major buildings in the Prairies	BldgRes; Prairie	M.E. Lux	(306) 665-4201
BUILDING MAINTENANCE	Structural safety and serviceability	BldgRes; Building Structures	D.E. Allen	(613) 993-2433
BUILDING MATERIALS	Formaldehyde out-gassing problems	BldgRes; Building Performance	C.J. Shirtliffe	(613) 993-1231
BUILDING MATERIALS	Effect of thermal insulation on basement heat loss	BldgRes; Prairie	D.A. Figley	(306) 665-4200
BUILDING MATERIALS	Arrangement and performance of archaic materials in existing buildings	BldgRes; Atlantic	D.L. Scott	(902) 426-8255
BUILDING MATERIALS:BRICKS	Durability of structural clay products	BldgRes; Building Materials	J.H.I. Kung	(613) 993-1596

Keyword	Description	Where work is done	Contact	Telephone
BUILDING MATERIALS: CHARACTERISTICS	Developing improved methods for determining heat and moisture characteristics of materials	BldgRes; Thermal Properties	M. Bomberg	(613) 993-1421
BUILDING MATERIALS:CONCRETE	Waste and by-product utilization in concrete technology	BldgRes; Building Materials	R.F. Feldman	(613) 993-1596
BUILDING MATERIALS:CONCRETE	Performance of concrete in the presence of aggressive solutions	BldgRes; Building Materials	R.F. Feldman	(613) 993-1596
BUILDING MATERIALS:CONCRETE	Performance of Canadian aggregates	BldgRes; Building Materials	P.E. Grattan-Bellew	(613) 993-1596
BUILDING MATERIALS:CONCRETE	Basic engineering properties of concrete	BldgRes; Building Materials	R.F. Feldman	(613) 993-1596
BUILDING MATERIALS:CONCRETE	Physical and mechanical properties of repair systems	BldgRes; Building Materials	J.J. Beaudoin	(613) 993-1596
BUILDING MATERIALS:CONCRETE	Durability to frost action in concrete and other porous materials	BldgRes; Building Materials	G.G. Litvan	(613) 993-1596
BUILDING MATERIALS:CONCRETE	Chemical processes in concrete	BldgRes; Building Materials	V.S. Ramachandran	(613) 993-1596
BUILDING MATERIALS:DURABILITY	Effect of environmental factors on the performance of composite systems	BldgRes; Building Materials	G. Litvan	(613) 993-1596
BUILDING MATERIALS:DURABILITY	Properties and performance of bituminous and polymeric roofing materials	BldgRes; Building Materials	H.O. Laaly	(613) 993-1596

Keyword	Description	Where work is done	Contact	Telephone
BUILDING MATERIALS:FIRE	Product behaviour under fire exposure conditions	BldgRes; Fire Research	K. Sumi	(613) 993-2204
BUILDING MATERIALS:FIRE	Fire resistance of building elements	BldgRes; Fire Research	T.T. Lie	(613) 993-2204
BUILDING MATERIALS:FIRE	Material behaviour under fire exposure conditions	BldgRes; Fire Research	Y. Tsuchiya	(613) 993-2204
BUILDING MATERIALS:FIRE	Fire related processes	BldgRes; Fire Research	F.R.S. Clark	(613) 993-2204
BUILDING MATERIALS:MASONRY	Masonry research: clay brick and concrete block masonry	BldgRes; Building Structures	A.H.P. Maurenbrecher	(613) 993-2433
BUILDING MATERIALS:PAINT	Performance of clear and pigmented coatings	BldgRes; Building Materials	H.E. Ashton	(613) 993-1596
BUILDING MATERIALS:PROPERTIES	Microstructural and compositional characterization of building materials	BldgRes; Building Materials	P.E. Grattan-Bellew	(613) 993-1596
BUILDING MATERIALS:SEALANTS	Properties and performance of joint materials	BldgRes; Building Materials	K.K. Karpati	(613) 993-1596
BUILDING MATERIALS:SOLAR COLLECTORS	Durability of cover and absorber materials for solar collectors	BldgRes; Building Materials	R.S. Yamasaki	(613) 993-1596
BUILDING PERFORMANCE	Rehabilitation of buildings	BldgRes; Building Performance	A.H. Wilson	(613) 993-1231
BUILDING PERFORMANCE	Performance of wood frame enclosures in a maritime climate	BldgRes; Atlantic	D.L. Scott	(902) 426-8255
BUILDING PERFORMANCE	Effect of thermal insulation on basement heat loss	BldgRes; Prairie	D.A. Figley	(306) 665-4200

Keyword	Description	Where work is done	Contact	Telephone
BUILDING PERFORMANCE	Air infiltration in residential buildings	BldgRes; Prairie	R.S. Dumont	(306) 665-4204
BUILDING PERFORMANCE	Arrangement and performance of archaic materials in existing buildings	BldgRes; Atlantic	D.L. Scott	(902) 426-8255
BUILDING PERFORMANCE	Behaviour of flat roofing systems and components	BldgRes; Prairie	C.P. Hedlin	(306) 665-4203
BUILDING PERFORMANCE	Assessing the durability of sealed double and triple glazing units	BldgRes; Thermal Properties	R.P. Bowen	(613) 993-1421
BUILDING PERFORMANCE:ACOUSTICS	In-situ and laboratory performance of building elements and materials	BldgRes; Noise and Vibration	J.D. Quirt	(613) 993-2305
BUILDING PERFORMANCE:ACOUSTICS	Propagation of sound in and around buildings	BldgRes; Noise and Vibration	R.E. Halliwell	(613) 993-2305
BUILDING PERFORMANCE:ACOUSTICS	Measurements of acoustical performance of building elements and materials	BldgRes; Noise and Vibration	A.C.C. Warnock	(613) 993-2305
BUILDING PERFORMANCE:COST-BENEFIT STUDIES	Monitoring of construction activity in Canada; materials, space and energy evaluation; life cycle costing	BldgRes; Building Performance	A.S. Rakhra	(613) 993-1231
BUILDING PERFORMANCE:MATERIALS	Effect of environmental factors on the performance of composite systems	BldgRes; Building Materials	G. Litvan	(613) 993-1596
BUILDING PERFORMANCE:SAFETY	Structural safety and serviceability	BldgRes; Building Structures	D.E. Allen	(613) 993-2433

Keyword	Description	Where work is done	Contact	Telephone
BUILDING PERFORMANCE:SEALANTS	Properties and performance of joint materials	BldgRes; Building Materials	K.K. Karpati	(613) 993-1596
BUILDING PERFORMANCE:SNOW	Snow loads on roofs	BldgRes; Building Structures	D.A. Taylor	(613) 993-2433
BUILDING PERFORMANCE:THERMAL	Thermal performance of full scale wall and ceiling assemblies	BldgRes; Thermal Properties	W.C. Brown	(613) 993-1421
BUILDING PERFORMANCE:WEATHERING	Weathering factors and accelerated methods for assessing durability of organic building materials	BldgRes; Building Materials	R.S. Yamasaki	(613) 993-1596
BUILDING PERFORMANCE:WIND	Wind effects on buildings and structures	BldgRes; Building Structures	W.A. Dalgliesh	(613) 993-2433
BUILDING REHABILITATION	Rehabilitation of buildings	BldgRes; Building Performance	A.H. Wilson	(613) 993-1231
BUILDING SAFETY:EARTHQUAKES	Seismic design of structures	BldgRes; Noise and Vibration	J.H. Rainer	(613) 993-2305
BUILDING SAFETY:FIRE	Smoke control in large buildings	BldgRes; Energy and Services	G.T. Tamura	(613) 993-9580
BUILDING SAFETY:FIRE	Material behaviour under fire exposure conditions	BldgRes; Fire Research	Y. Tsuchiya	(613) 993-2204
BUILDING SAFETY:FIRE	Design of buildings for fire safety	BldgRes; Fire Research	M. Galbreath	(613) 993-2204
BUILDING USE	Occupancy, use and maintenance	BldgRes; Building Performance	J.R. Champagne	(613) 993-1231
CALIBRATION FLOW METERS	Calibration of flow devices	MechEng; Hydraulics	J. Ploeg	(613) 993-2417

Keyword	Description	Where work is done	Contact	Telephone
CALORIMETRY	Absorbed dose calorimetry	Physics; X-rays and Nuclear Radiation	D.W. Rogers	(613) 993-2197
CALORIMETRY	----------	Physics; Solid State Science	D.L. Martin	(613) 993-9946
CALORIMETRY:LIQUIDS	Calorimetric studies	Chem; Thermochemistry, Sussex	Dr. G.C. Benson	(613) 992-3839
CANADARM	Remote manipulation in space	Aero; Teleoperator Project Office	K.H. Doetsch	(613) 993-2110 993-1702
CANADARM:BRAKING	Investigation of in-vacuo friction behaviour of brake material Canadarm	MechEng; West	C. Dayson	(604) 732-4477
CARBOHYDRATE CHEMISTRY	Polysaccharides of Sporothrix schenkii and T. cruzi	PlantBio; Chemistry	P.A.J. Gorin	(306) 665-5251
CARCINOGENICITY	Development of a general in vitro test for carcinogenesis	BioSci; Cell Physiology, MRL	J.F. Whitfield	(613) 993-9090
CASTING METHODS	High-pressure casting of high-melting point alloys	Indust. Mat.: Chemical Analysis and Corrosion Section	G. Bégin	(514) 641-2280
CASTING METHODS	Manufacturing niobium-coppertin composites using continuous casting	Indust. Mat.: Instruments and systems Section	H. LeHuy	(514) 641-2280
CASTING METHODS	Casting partially solidified alloys	Indust. Mat. Instruments and Systems Section	H. LeHuy	(514) 641-2280

Keyword	Description	Where work is done	Contact	Telephone
CASTING:LOST WAX	Lost wax casting process	Indust. Mat.: Coatings Section at Institut national de la recherche scientifique in Varennes	S. Dallaire	(514) 652-9836
CATALYSIS:METAL CLUSTERS	Preparation and properties of metal clusters	Chem; Kinetics & Catalysis, MRL	J.R. Morton	(613) 993-2372
CATALYSIS:METAL CLUSTERS	Heterogenous Catalysis	Chem; Kinetics & Catalysis, MRL	J.R. Morton	(613) 993-2372
CAVITATION:SHIPS' PROPELLERS	Design, modelling and full scale evaluation of propeller performance	Arctic; Research	M. Michallidis	(613) 993-2288
CELL CULTURE LINES	Production and selection of mutants; metabolic production in cell cultures; production of high yielding cell culture lines for secondary metabolites	PlantBio; Plant cell	F. Constabel	(306) 665-5281
CELL CULTURE TECHNIQUES	Protoplast fusion and somatic hybridization; differentiation and plant regeneration in somatic cells; protoplast and cell nutrition and culture techniques	PlantBio; Plant cell	K.N. Kao	(306) 665-5279
CELL CULTURES:PRODUCTS	Production and selection of mutants; metabolic production in cell cultures; production of high yielding cell culture lines for secondary metabolites	PlantBio; Plant cell	F. Constabel	(306) 665-5281
CELL CULTURE:PHASED	Continuous, synchronous and phased culture of microorganisms	PlantBio; Microbial	P.S.S. Dawson	(306) 665-5246

Keyword	Description	Where work is done	Contact	Telephone
CELL MEMBRANES	Action of drugs on membrane structure	BioSci; Molecular Biophysics, Sussex	I.C.P. Smith	(613) 995-7852
CELL NUTRITION	Protoplast fusion and somatic hybridization; differentiation and plant regeneration in somatic cells; protoplast and cell nutrition and culture techniques	PlantBio; Plant cell	K.N. Kao	(306) 665-5279
CELL PHYSIOLOGY	Biochemical and physiological studies of mechanisms of control of normal and malignant cells	DBS;BioSci; Cell Physiology Group, MRL	J.F. Whitfield	(613) 993-9090
CELL PHYSIOLOGY	Fibrogenesis in cells	BioSci; Cell Biophysics, Sussex	J.R. Colvin	(613) 593-4712
CELL PHYSIOLOGY	Fine structures of cells by electron microscopy	BioSci; Cell Biophysics, Sussex	J.R. Colvin	(613) 593-4712
CELL PHYSIOLOGY	Biochemical and physiological studies of mechanisms of control of normal and malignant cells	BioSci; Cell Physiology, MRL	J.F. Whitfield	(613) 993-9090
CELL PROLIFERATION	Biochemical and physiological studies of mechanisms of control of normal and malignant cells	BioSci; Cell Physiology Group, MRL	J.F. Whitfield	(613) 993-9090
CELL PROLIFERATION	Biochemical and physiological studies of mechanisms of control of normal and malignant cells	BioSci; Cell Physiology, MRL	J.F. Whitfield	(613) 993-9090

Keyword	Description	Where work is done	Contact	Telephone
CELLULOSE:ANAEROBIC DEGRADATION	Anaerobic degradation of cellulose	BioSci; Biological Production of Fuels; Microbiology and Immunochemistry, Sussex	L. van den Berg and S.M. Martin	(613) 992-3310 (613) 992-2087
CERAMIC-METALLIC POWDERS	Fabrication of metallic and ceramic and metal-ceramic powders using unconventional technique	Indust. Mat.: Coatings Section at Institut national de la recherche scientifique in Varennes	S. Dallaire	(514) 652-9836
CERAMIC-METALLIC POWDERS	Production and evaluation of a wear-resistant material with cermet particles imbedded on a metallic matrix	Indust. Mat.: Coatings Section at Institut national de la recherche scientifique in Varennes	S. Dallaire	(514) 652-9836
CHEMICAL BONDS	Physical and chemical instrumental analyses on the structure of organic molecules. Research directed at understanding of hydrogen bonding; use of isotope labelling, fabrication of special probes; development of analytical techniques and procedures	Atlantic; Physical Analyses	A. Hanson	(902) 426-8258
CHEMICAL PHYSICS:CONDENSED PHASES	Chemical physics of condensed phases	Chem; Theoretical Chemistry, Sussex	W. Siebrand	(613) 992-6808
CHEMISTRY:ENERGY TRANSFER	Energy and charge transfer	Chem; Theoretical Chemistry, Sussex	W. Siebrand	(613) 992-6808
CHEMISTRY:MARINE	Marine analytical research	Chem; Analytical Chemistry, MRL	S. Berman	(613) 993-2043
CHEMISTRY:MARINE	Marine analytical chemistry reference materials; development of methods for analysis of materials with high salt concentrations	Atlantic; Analytical Chemistry	W. Jamieson	(902) 426-8279

Keyword	Description	Where work is done	Contact	Telephone
CHEMISTRY:ORGANIC REACTIONS	Reactions and methods in organic synthesis	Chem; Organic Chemistry, Sussex	O.E. Edwards	(613) 992-4092
CHEMISTRY:TRANSIENT SPECIES	Photophysics, photochemistry of transient species	Chem; Chemical Physics, Sussex	D.F. Williams	(613) 992-5614
CHROMOSOMES	Chromosome structure and function	BioSci; Molecular Genetics, Sussex	V.L. Selligy	(613) 992-6055
CLIMATIC ENGINEERING	Testing of industrial equipment and aircraft to meet climatic standards	MechEng; Low Temperature	T.R. Ringer	(613) 993-2439
CLIMATIC ENGINEERING	Heat and moisture balance in the Prairie region	BldgRes; Prairie	H.W. Orr	(306) 665-4200
CLIMATIC ENGINEERING	Performance of wood frame enclosures in a maritime climate	BldgRes; Atlantic	D.L. Scott	(902) 426-8255
CLIMATIC ENGINEERING:BUILDING MATERIALS	Effect of environmental factors on the performance of composite systems	BldgRes; Building Materials	G. Litvan	(613) 993-1596
CLIMATIC ENGINEERING:BUILDINGS	Effect of environment on plastic building materials	BldgRes; Building Materials	A. Blaga	(613) 993-1596
CLIMATIC ENGINEERING:BUILDINGS	Weathering factors and accelerated methods for assessing durability of organic building materials	BldgRes; Building Materials	R.S. Yamasaki	(613) 993-1596
CLIMATIC ENGINEERING:CONCRETE	Durability to frost action in concrete and other porous materials	BldgRes; Building Materials	G.G. Litvan	(613) 993-1596
CLIMATIC ENGINEERING:RAILWAY VEHICLES	Snow ingestion by engineering equipment	MechEng; Low Temperature	T.R. Ringer	(613) 993-2439

Keyword	Description	Where work is done	Contact	Telephone
COAL PROCESSING	Coal beneficiation	Chem; Chemical Engineering, MRL	Dr. C.E. Capes	(613) 993-2455
COAL:SLURRIES	Studies on beneficiation, pyrolysis of coal and peat; use of coal-liquid slurries in utility furnaces	Atlantic; High Temperature Chemistry	S. Whiteway	(902) 426-8269
COASTAL ENGINEERING	Mathematic modelling of coastal engineering processes	MechEng; Hydraulics	J. Ploeg	(613) 993-2417
COASTAL ENGINEERING	Hydraulic studies of rivers, estuaries, harbours and offshore structures	MechEng; Hydraulics	J. Ploeg	(613) 993-2417
COASTAL ENGINEERING:BEACHES	Beach erosion processes	MechEng; Hydraulics	J. Ploeg	(613) 993-2417
COLLOID CHEMISTRY	Technology of colloids and surfaces	Chem; Colloid & Clathrate Chemistry, MRL	D.W. Davidson	(613) 993-2011
COLOUR MEASUREMENT	Light and colour studies and standards	Physics; Optics	G. Wyszecki	(513) 993-2504
COMBUSTION:DIESEL FUELS	Study of fuel spray characteristics and their relation to diesel combustion	MechEng; Fuels and Lubricants	R.B. Whyte	(613) 993-2415
COMBUSTION:EXHAUST EMISSIONS	Exhaust emissions measurement	MechEng; Fuels and Lubricants	R.B. Whyte	(613) 993-2415
COMBUSTION:GAS TURBINE	Combustion studies and development of combustion systems for industrial gas turbine applications	MechEng; Gas Dynamics	R.A. Tyler	(613) 993-2442

Keyword	Description	Where work is done	Contact	Telephone
COMBUSTION:TEXTILES	Combustion and flame retardancy	Chem; Textile Chemistry, MRL	D.J. Carlsson	(613) 993-2268
COMPUTER AIDED DESIGN AND MANUFACTURING	Development of design support computer programs and data-base facilities for CAD/CAM systems	ElecEng; Information Science	W.H. Henneker	(613) 993-2007
COMPUTER AIDED DESIGN	NRC CAD activity support	MechEng; Systems	P.A. Hamill	(613) 993-9208
COMPUTER AIDED DESIGN AND MANUFACTURING	Technical assistance to industry in CAD/CAM	MechEng; West	C. Dayson	(604) 993-4477
COMPUTER AIDED DESIGN AND MANUFACTURING	Low cost CAD/CAM system development for NC applications	MechEng; West	C. Dayson	(604) 732-4477
COMPUTER AIDED DESIGN:BUILDING CONSTRUCTION	Application of computers construction	BldgRes; Building Performance	D.J. Vanier	(613) 993-1231
COMPUTER AIDED DESIGN:PLASTICS	Preliminary study of CAD/CAM applications in plastics processing	Indust. Mat.: Plastics Section	G. Salloum	(514) 641-2280
COMPUTER AIDED LEARNING	Development, implementation and evaluation of a national authoring language (NATAL-74) for CAL	ElecEng; Information Science	J.W. Brahan	(613) 993-2484
COMPUTER AIDED LEARNING	Development, operation and maintenance of a computer network for cooperative research in CAL	ElecEng; Information Science	A.M. Hlady	(613) 993-2007
COMPUTER AIDED MANUFACTURE:PLASTICS	Preliminary study of CAD/CAM applications in plastics processing	Indust. Mat.: Plastics Section	G. Salloum	(514) 641-2280

Keyword	Description	Where work is done	Contact	Telephone
COMPUTER AIDED MANUFACTURING	Development of design support computer programs and data-base facilities for CAD/CAM systems	ElecEng; Information Science	W.H. Henneker	(613) 993-2007
COMPUTER GRAPHICS:CARDIAC ANALYSIS	Interactive computer graphic techniques for cardiac data analysis	ElecEng; Computer Graphics	T. Shepertycki	(613) 993-2629
COMPUTER GRAPHICS:COMPUTER AIDED DESIGN	Development of advanced computer graphic technology in support of CAD/CAM	ElecEng; Computer Graphics	K. Evans	(613) 993-2629
COMPUTER MODELLING	Computer modelling and simulation: interlaboratory applications	MechEng; Systems	P.A. Hamill	(613) 993-9208
COMPUTER MODELLING FACILITIES	Computer modelling and simulation: development of methods and facilities	MechEng; Systems	P.A. Hamill	(613) 993-9208
COMPUTER MODELLING:AERODYNAMICS	Computation fluid dynamics	Aero; High Speed Aerodynamics	D. Jones	(613) 998-3545
COMPUTER MODELLING:INDUSTRIAL	Interactive computer modelling of industrial processes	MechEng; Systems	P.A. Hamill	(613) 993-9208
COMPUTER MODELLING:INDUSTRIAL	Computer modelling and simulation: proprietary applications by industry	MechEng; Systems	P.A. Hamill	(613) 993-9208
COMPUTER SIMULATION FACILITIES	Computer modelling and simulation: development of methods and facilities	MechEng; Systems	P.A. Hamill	(613) 993-9208
COMPUTER SIMULATION:PLASMA DYNAMICS	Numerical studies in plasma dynamics	MechEng; Gas Dynamics	R.A. Tyler	(613) 993-2442

Keyword	Description	Where work is done	Contact	Telephone
COMPUTER VISION	Development of image processing techniques for industrial applications	ElecEng; Computer Graphics	T. Kasvand	(613) 993-2629
COMPUTER-AIDED DESIGN:SHIP HULLS AND PROPELLERS	Computer aided design and manufacture of ship hulls and propellers	Arctic; Systems	D. Gospodnetic	(613) 993-2288
COMPUTER-ASSISTED TRAINING	Undertaking collaborative work with Canadian industry to define and develop computer-assisted training systems	ElecEng; Information Science	J.W. Brahan	(613) 993-2484
COMPUTER-VISION: IMAGE PROCESSING	Research in computer vision and the development of algorithms for scene recognition and shape detection	ElecEng; Computer Graphics	T. Kasvand	(613) 993-2629
CONCRETE:ADDITIVES	Waste and by-product utilization in concrete technology	BldgRes; Building Materials	R.F. Feldman	(613) 993-1596
CONCRETE:CHEMICAL REACTIONS	Performance of Canadian aggregates	BldgRes; Building Materials	P.E. Grattan-Bellew	(613) 993-1596
CONCRETE:CHEMICAL REACTIONS	Chemical processes in concrete	BldgRes; Building Materials	V.S. Ramachandran	(613) 993-1596
CONCRETE:CHEMICAL REACTIONS	Performance of concrete in the presence of aggressive solutions	BldgRes; Building Materials	R.F. Feldman	(613) 993-1596
CONCRETE:DURABILITY	Durability to frost action in concrete and other porous materials	BldgRes; Building Materials	G.G. Litvan	(613) 993-1596
CONCRETE:DURABILITY	Performance of concrete in the presence of aggressive solutions	BldgRes; Building Materials	R.F. Feldman	(613) 993-1596

Keyword	Description	Where work is done	Contact	Telephone
CONCRETE:REPAIR	Physical and mechanical properties of repair systems	BldgRes; Building Materials	J.J. Beaudoin	(613) 993-1596
CONCRETE:STRENGTH	Basic engineering properties of concrete	BldgRes; Building Materials	R.F. Feldman	(613) 993-1596
CORROSION: ELECTROCHEMICAL	Electrochemistry	Chem; Metallic Corrosion and Oxidation, MRL	M.J. Graham	(613) 993-3548
CORROSION:HIGH TEMPERATURE	High temperature sulphidation and oxidation	Chem; Metallic Corrosion and Oxidation, MRL	M.J. Graham	(613) 993-3548
CORROSION:METALS	Corrosion	Chem; Metallic Corrosion and Oxidation, MRL	M.J. Graham	(613) 993-3548
CORROSION:METALS	Formation and structure of oxide films	Chem; Metallic Corrosion and Oxidation, MRL	M.J. Graham	(613) 993-3548
COSMIC RAYS	----------	Astro; Space Physics, Sussex	M. Bercovitch	(613) 992-2734
CRYOBIOLOGY:PLANT CELL	Freeze-preservation of cell cultures; meristem culture and virus elimination	PlantBio; Plant cell	K.K. Kartha	(306) 665-5283
CRYOGENIC STANDARDS	----------	Physics; Heat and Thermometry	J. Ancsin	(613) 993-2313
CRYSTALLOGRAPHY	X-ray crystallography	Chem; Solid State Chemistry, MRL	C.M. Hurd	(613) 993-2514
DATA PROCESSING:AUTOMATED	Methods for automatic processing of experimental data	PlantBio; Microbial	M.S. Lapp	(306) 665-5250

Keyword	Description	Where work is done	Contact	Telephone
DIAGNOSTICS	Synthetic antigens from carbohydrates	BioSci; Microbiology and Immunochemistry, Sussex	H.J. Jennings	(613) 992-5729
DIAGNOSTICS	Diagnostics and vaccines from pathogenic bacteria	BioSci; Microbiology and Immunochemistry, Sussex	M.B. Perry	(613) 992-8995
DIAGNOSTICS	Monoclonal antibody by hybridoma technology	BioSci; Microbiology and Immunochemistry, Sussex	D.R. Bundle	(613) 593-5291
DIATOMIC MOLECULES:ELECTRONIC SPECTRA	----------	Astro; Spectroscopy, Sussex	K.P. Huber	(613) 996-0940
DIELECTRIC PROPERTIES:SOLIDS	NMR and dielectric properties of solids	Chem; Colloid & Clathrate Chemistry, MRL	D.W. Davidson	(613) 993-2011
DIELECTRICS	Accelerated aging of dielectric insulation in high voltage cables	ElecEng; Power Engineering	R.J. Densley	(613) 993-2660
DOSIMETRY	----------	Physics: X-rays and Nuclear Radiation	K.W. Geiger	(613) 993-2197
DOSIMETRY:CHEMICAL	----------	Physics: X-rays and Nuclear Radiation	N.V. Klassen	(613) 993-9352
DOSIMETRY:RADIATION	----------	Physics: X-rays and Nuclear Radiation	D.W. Rogers	(613) 993-2715
EARTHQUAKE ENGINEERING	Seismic design of structures	BldgRes; Noise and Vibration	J.H. Rainer	(613) 993-2305
ECOTOXICOLOGY	Sub-cellular mechanisms of heavy metals' toxicity	BioSci; Ecotoxicology, Tunney's Pasture	D.R. Miller	(613) 593-6912

Keyword	Description	Where work is done	Contact	Telephone
ECOTOXICOLOGY	Formulation and validation of mathematical models of pollutants movement in aquatic ecosystems	BioSci; Ecotoxicology, Tunney's Pasture	D.R. Miller	(613) 593-6912
ECOTOXICOLOGY	Determination of transport, distribution and biological impact of trace elements and organic pollutants in rivers	BioSci; Ecotoxicology, Tunney's Pasture	D.R. Miller	(613) 593-6912
ECOTOXICOLOGY	Bioaccumulation and toxicity of compounds of mercury in aquatic ecosystems	BioSci; Ecotoxicology, Tunney's Pasture	D.R. Miller	(613) 593-6912
ECOTOXICOLOGY	Biology and physiology of freshwater vascular plants	BioSci; Ecotoxicology, Tunney's Pasture	D.R. Miller	(613) 593-6912
ECOTOXICOLOGY	Development and compilation of scientific criteria for environmental quality	BioSci; Environmental Secretariat, Sussex	I. Hoffman	(613) 996-6810
ELECTRICAL MEASUREMENTS	Precision electrical measurements	ElecEng; Power Engineering	W.J.M. Moore	(613) 993-2660
ELECTRICAL STANDARDS	Alternating current; radio frequency; microwaves	Physics; Electrical and Time Standards	A.F. Dunn	(613) 993-2867
ELECTRICAL STANDARDS VON KLITZING EFFECT	----------	Physics; Electrical and Time Standards	B.M. Wood	(613) 993-2898
ELECTRICAL STANDARDS: JOSEPHSON EFFECT	----------	Physics; Electrical and Time Standards	B.M. Wood	(613) 993-2898
ELECTROMAGNETIC RADIATION BIOLOGY	The effects of EMR on the biological system	BioSci; Animal Physiology	E. Preston	(613) 993-0482

Keyword	Description	Where work is done	Contact	Telephone
ELECTRON ACCELERATORS	Electron linear acceleration	Physics; X-rays and Nuclear Radiations	W.F. Davidson	(613) 993-9352
ELECTRON BEAM WELDING	Development and demonstration of advanced manufacturing technology	MechEng; Manufacturing Technology Centre	G. McGregor	(613) 993-2436
ELECTRON MICROSCOPY	Fine structures of cells by electron microscopy	BioSci; Cell Biophysics, Sussex	J.R. Colvin	(613) 593-4712
ELECTRON MICROSCOPY	Physical and chemical instrumental analyses on the structure of organic molecules. Research directed at understanding of hydrogen bonding; use of isotope labelling, fabrication of special probes; development of analytical techniques and procedures	Atlantic; Physical Analyses	P. Odense	(902) 426-3258
ELECTRONIC SPECTRA:DIATOMIC MOLECULES	----------	Astro; Spectroscopy, Sussex	K.P. Huber	(613) 996-0940
ELECTRONIC SPECTRA: FREE RADICALS	----------	Astro; Spectroscopy, Sussex	M. Vervloet	(613) 996-0940
ELECTRONIC SPECTRA:FREE RADICALS	----------	Astro; Spectroscopy, Sussex	D.A. Ramsay	(613) 996-5309
ELECTRONIC SPECTRA: MOLECULAR IONS	----------	Astro; Spectroscopy, Sussex	H. Lew	(613) 992-0535
ELECTRONIC SPECTRA: POLYATOMIC MOLECULES	----------	Astro; Spectroscopy, Sussex	D.A. Ramsay	(613) 996-5309
ENERGY CONSERVATION:BUILDINGS	Energy conservation and use in large buildings	BldgRes; Energy and Services	A.H. Elmahdy	(613) 993-9580

Keyword	Description	Where work is done	Contact	Telephone
ENERGY CONSERVATION:BUILDINGS	Guidelines for selection of energy conservation techniques	BldgRes; Thermal Performance	D.M. Sander	(613) 993-1421
ENERGY CONSERVATION:BUILDINGS	Ground heat storage	BldgRes; Geotechnical	J.H.L. Palmer	(613) 993-1466
ENERGY EFFICIENCY:AERODYNAMIC DRAG	Energy efficiency in the transportation system - truck aerodynamic drag	MechEng; Engine	H.S. Fowler	(613) 993-2425
ENERGY STORAGE:MECHANICAL	Flywheels	Energy/Chem; Hydrogen	J.R.B. Murphy	(613) 993-0771
ENGINE EFFICIENCY	Energy efficiency in the transportation system - vehicular engine air cooling dynamics	MechEng; Engine	H.S. Fowler	(613) 993-2425
ENGINE:COOLING	Energy efficiency in the transportation system - vehicular engine air cooling dynamics	MechEng; Engine	H.S. Fowler	(613) 993-2425
ENVIRONMENTAL QUALITY	Development and compilation of scientific criteria for environmental quality	BioSci; Environmental Secretariat, Sussex	I. Hoffman	(613) 996-6810
ENZYMES	Biochemistry of enzymes and proteins	BioSci; Molecular Biochemistry Group, Sussex	K.R. Lynn	(613) 992-1321
ENZYMES	Raman spectroscopy of interactions between small molecules and proteins	BioSci; Molecular Biochemistry, Sussex	P.R. Carey	(613) 992-6541
ENZYMES	Anaerobic degradation of cellulose	BioSci; Biological Production of Fuels; Microbiology and Immunochemistry, Sussex	L. van den Berg and S.M. Martin	(613) 992-3310 (613) 992-2087

Keyword	Description	Where work is done	Contact	Telephone
ENZYMES	Hydrogenase from anaerobes	BioSci; Molecular Biochemistry, Sussex	W.G. Martin	(613) 992-6512
ENZYMOLOGY	Biochemistry of enzymes and proteins	BioSci; Molecular Biochemistry Group, Sussex	K.R. Lynn	(613) 992-1321
ERGONOMICS	Control and tracking characteristics of the human operator	MechEng; System	P.A. Hamill	(613) 993-9208
EROSION:SHORE LINE	Beach erosion processes	MechEng; Hydraulics	J. Ploeg	(613) 993-2417
FATIGUE:CORROSION	Corrosion fatigue of stainless steel suction rolls	Indust. Mat.; Chemical Analysis and Corrosion Section	M. Alt-Bassidi	(514) 641-2280
FATIGUE:FRETTING	----------	Indust. Mat.; Chemical Analysis and Corrosion Section	J. Masounave	(514) 641-2280
FATIGUE:PLASTICS	Fatigue of engineering plastics	Indust. Mat.: Plastics Section	R. Connelly	(514) 641-2280
FATIGUE:RANDOM	----------	Indust. Mat.; Chemical Analysis and Corrosion Section	F.G. Hamel	(514) 641-2280
FATTY ACID CHEMISTRY	Synthesis and chemistry of long chain fatty acids	PlantBio; Chemistry	A.P. Tulloch	(306) 665-5258
FERMENTATION	Biological production of fuels: ethanol, esters, higher alcohols	DBS; Biological Production of Fuels Group, Rideau Falls Laboratory, Sussex	L. van den Berg	(613) 992-3310
FERMENTATION	5-Carbon sugars, alcohol, waste sulfite liquor	DBS; Molecular Genetics Group, Sussex	H. Schneider	(613) 992-6512

Keyword	Description	Where work is done	Contact	Telephone
FERMENTATION	Bacteria culture collection and associated taxonomic studies	BioSci; Microbiology and Immunochemistry, Sussex	R.K. Latta	(613) 992-2367
FERMENTATION	Fermentation technology program	PlantBio; Biotechnology	K.L. Phillips	(306) 665-4187
FERMENTATION:BIOGAS	Production of methane from food and municipal plant waste	BioSci; Biological Production of Fuels, Sussex	L. van den Berg	(513) 992-3310
FERMENTATION: CONTINUOUS	Continuous, synchronous and phased culture of microorganisms	PlantBio; Microbial	P.S.S. Dawson	(306) 665-5246
FERNS	Research in support of agriculture: effect of fungal toxins on growth of ruminants; ecology and chemistry of lichens and sphagnum mosses; development of the ostrich fern as an agronomic crop	Atlantic; Marine Plant Ecology	P. von Aderkas	(902) 426-8273
FIBRE COMPOSITES	Cement-fibre composites	Indust. Mat.: Plastics Section	Y.R. LaPalme	(514) 641-2280
FIBRE COMPOSITES	Interface design for improved fibre composites	Indust. Mat.; Plastics Section	L.P. Hébert	(514) 641-2280
FIBRES AND PLASTICS: COMBUSTION	Combustion and flame retardancy	Chem; Textile Chemistry, MRL	D.J. Carlsson	(613) 993-2268
FIELD PEAS:PROCESSING	Wet processing production of protein and starch from field peas	PlantBio; Biotechnology	R.T. Tyler	(306) 665-5268
FILTERS:OPTICAL	----------	Physics; Mechanical and Optical	K.H. Hart	(613) 993-3326

Keyword	Description	Where work is done	Contact	Telephone
FILTRATION:REVERSE OSMOSIS	Membrane properties and separations	Chem; Chemical Engineering, MRL	C.E. Capes	(613) 993-2455
FIRE RESEARCH:BUILDINGS	Material behaviour under fire exposure conditions	BldgRes; Fire Research	Y. Tsuchiya	(613) 993-2204
FIRE RESEARCH:BUILDINGS	Fire related processes	BldgRes; Fire Research	F.R.S. Clark	(613) 993-2204
FIRE RESEARCH:BUILDINGS	Smoke control in large buildings	BldgRes; Energy and Services	G.T. Tamura	(613) 993-9580
FIRE RESEARCH:BUILDINGS	Fire resistance of building elements	BldgRes; Fire Research	T.T. Lie	(613) 993-2204
FIRE RESEARCH:BUILDINGS	Product behaviour under fire exposure conditions	BldgRes; Fire Research	K. Sumi	(613) 993-2204
FIRE RESEARCH:BUILDINGS	Design of buildings for fire safety	BldgRes; Fire Research	M. Galbreath	(613) 993-2204
FIRE SAFETY:BUILDINGS	Design of buildings for fire safety	BldgRes; Fire Research	M. Galbreath	(613) 993-2204
FLAME RETARDATION: TEXTILES	Combustion and flame retardancy	Chem; Textile Chemistry, MRL	D.J. Carlsson	(613) 993-2268
FLEXIBLE MANUFACTURING CELLS	Experimental computer integrated manufacturing cell	MechEng; Systems	P.A. Hamill	(613) 993-9208
FLEXIBLE MANUFACTURING CELLS	Development and demonstration of advanced manufacturing technology	MechEng; Manufacturing Technology Centre	G. McGregor	(613) 993-2436
FLIGHT RECORDER ANALYSIS	Aircraft operational problems	Aero; Flight Research	B. Calger	(613) 998-3149

Keyword	Description	Where work is done	Contact	Telephone
FLOW METERS:CALIBRATION	Calibration of flow devices	MechEng; Hydraulics	J. Ploeg	(613) 993-2417
FLUID CIRCUITS	Fluid circuits and sensors for industrial applications	MechEng; Systems	P.A. Hamill	(613) 993-9208
FLUID DYNAMICS	Fluid and plasma dynamics applied to industrial processes	MechEng; Gas Dynamics	R.A. Tyler	(613) 993-2442
FLUID SENSORS	Fluid circuits and sensors for industrial application	MechEng; Systems	P.A. Hamill	(613) 993-9208
FOOD TECHNOLOGY	Quality and storage life of vegetables	BioSci; Biological Production of Fuels, Sussex	L. van den Berg	(613) 992-3310
FORENSIC SCIENCE	Public health and safety, accident investigations	Aero; Public Safety Project Office; Structures and Materials	J.G. Arnold W. Wallace	(613) 993-3778 993-2469
FORESTRY:AVIATION	Forest aviation; spray drift	Aero; Flight Research; Unsteady Aerodynamics	M. Sinclair R.S. Crabbe	(613) 998-3071 993-2521
FORESTRY:AVIATION	Forest aviation; spray drift	Aero; Flight Research; Unsteady Aerodynamics	M. Sinclair R.S. Crabbe	(613) 998-3071 993-2521
FOUNDATIONS: CONSTRUCTION	Deep foundations and excavations	BldgRes; Geotechnical	M. Bozozuk	(613) 993-1466
FOUNDATIONS:INSULATION	Effect of thermal insulation on basement heat loss	BldgRes; Prairie	D.A. Figley	(306) 665-4200
FREE RADICALS: ELECTRONIC SPECTRA	----------	Astro; Spectroscopy, Sussex	M. Vervloet	(613) 996-0940

Keyword	Description	Where work is done	Contact	Telephone
FREE RADICALS:ELECTRONIC SPECTRA	----------	Astro; Spectroscopy, Sussex	D.A. Ramsay	(613) 996-5309
FREE RADICALS:HYDROCARBONS	Free radical chemistry	Chem; Hydrocarbon Chemistry, Sussex	K.U. Ingold	(613) 992-3335
FREE RADICALS:INFRARED SPECTROSCOPY	Infrared spectroscopy of free radicals	Astro; Spectroscopy, Sussex	A.R.W. McKellar	(613) 992-6917
FREE RADICALS:INORGANIC	Preparation and properties of metal clusters	Chem; Kinetics & Catalysis, MRL	J.R. Morton	(613) 993-2372
FRICTION BRAKES	Investigation of in-vacuo friction behaviour of brake material Canadarm	MechEng; West	C. Dayson	(604) 732-4477
FRICTION RESEARCH	Applied friction and wear research	MechEng; West	C. Dayson	(604) 732-4477
FRICTION RESEARCH	Practical studies of tribological components: bearings, seals, brakes	MechEng; West	C. Dayson	(604) 732-4477
FROST ACTION:CONCRETE	Durability to frost action in concrete and other porous materials	BldgRes; Building Materials	G.G. Litvan	(613) 993-1596
FUELS:ANALYSIS	Analysis of the hydrocarbons in fuels	MechEng; Fuels and Lubricants	R.B. Whyte	(613) 993-2415
FUELS:BIOLOGICAL	Biological production of fuels ethanol, esters, higher alcohols	BioSci; Biological Production of Fuels Group, Rideau Falls Laboratory, Sussex	L. van den Berg	(613) 992-3310
FUELS:BLENDED	Methanol/gasoline blended fuel project	MechEng; Fuels and Lubricants	R.B. Whyte	(613) 993-2415

Keyword	Description	Where work is done	Contact	Telephone
FUELS:BLENDED	Coal/diesel fuel slurries	MechEng; Fuels and Lubricants	R.B. Whyte	(613) 993-2415
FUELS:TESTING	Miscellaneous laboratory test work in support of other projects and general enquiries	MechEng; Fuels and Lubricants	R.B. Whyte	(613) 993-2415
FUEL:CONVERSION	Installation of large diesel engine for natural gas conversion as fuel	MechEng; Engine	H.S. Fowler	(613) 993-2425
FUEL:DIESEL	Investigation of future diesel fuels	MechEng; Fuels and Lubricants	R.B. Whyte	(613) 993-2415
FUEL:DIESEL COMBUSTION	Study of fuel spray characteristics and their relation to diesel combustion	MechEng; Fuels and Lubricants	R.B. Whyte	(613) 993-2415
FUEL:ECONOMY	Retrofit devices for automotive fuel economy	MechEng; Fuels and Lubricants	R.B. Whyte	(613) 993-2415
FUEL:HANDLING AND SAFETY	Fuel handling investigations	MechEng; Fuels and Lubricants	R.B. Whyte	(613) 993-2415
FUEL:NATURAL GAS	Installation of large diesel engine for natural gas conversion as fuel	MechEng; Engine	H.S. Fowler	(613) 993-2425
FUNGI:LIGNIN DEGRADATION	Lignin degradation by fungi	PlantBio; Microbial	I.D. Reid	(306) 665-5242
FUSION ENERGY:MATERIALS	Research and development of materials for thermonuclear fusion devices	Indust. Mat. Instruments and Systems	A. Adnot	(514) 641-2280
FUSION:INERTIAL	Inertial confinement; laser fusion	Energy; Fusion Physics; Laser & Plasma	T.S. Brown	(613) 993-0810

Keyword	Description	Where work is done	Contact	Telephone
FUSION:MAGNETIC	Magnetic confinement; Tokamak	Energy; Fusion	T.S. Brown	(613) 993-0810
FUSION:MATERIALS & ENGINEERING	Fusion fuels; Tritium	Energy; Fusion	T.S. Brown	(613) 993-0810
GALAXIES:EXTERNAL	----------	Astro; Dominion Astrophysical Observatory; Dominion Radio Astrophysical Observatory	J. Kormendy C.H. Costain	(604) 388-3944 (604) 497-5321
GALAXIES:MILKY WAY	----------	Astro; Dominion Radio Astrophysical Observatory	L.A. Higgs	(604) 497-5321
GALAXY:MILKY WAY	----------	Astro; Dominion Astrophysical Observatory	D. Crampton	(604) 388-3900
GALAXY:MILKY WAY	Mapping of Milky Way Galaxy	Astro; Dominion Radio Astrophysical Observatory	R.S. Roger	(604) 497-5321
GAMMA RAY EXPOSURE:STANDARDS	----------	Physics: X-rays and Nuclear Radiation	K.W. Geiger	(613) 993-2197
GAS DYNAMICS	Gas dynamics test facilities	MechEng; Gas Dynamics	R.A. Tyler	(613) 993-2442
GAS HYDRATES	Gas hydrates	Chem; Colloid & Clathrate Chemistry, MRL	D.W. Davidson	(613) 993-2011
GAS TURBINE	Advanced gas turbine - highly loaded blading	MechEng; Gas Dynamics	R.A. Tyler	(613) 993-2442
GAS TURBINE	Novel fan configuration development	MechEng; Gas Dynamics	R.A. Tyler	(613) 993-2442

Keyword	Description	Where work is done	Contact	Telephone
GAS TURBINE	Combustion studies and development of combustion systems for industrial gas turbine applications	MechEng; Gas Dynamics	R.A. Tyler	(613) 993-2442
GAS TURBINE	Gas turbine fuel control study	MechEng; Engine	H.S. Fowler	(613) 993-2425
GAS TURBINES:ANALYSIS	Gas turbine operational problems - engines, emission analysis, performance testing	MechEng; Engine	H.S. Fowler	(613) 993-2425
GEOTECHNICS:AVALANCHE	Location, design and maintenance of engineering works and developments in avalanche areas	BldgRes; West	P.A. Schaerer	(604) 542-4829
GEOTECHNICS:FROST ACTION	Frost action in soils	BldgRes; Geotechnical	E. Penner	(613) 993-1466
GEOTECHNICS:OFFSHORE	Offshore structures	BldgRes; Geotechnical	J.M. Konrad	(613) 993-1466
GEOTECHNICS:PERMAFROST	Permafrost distribution and environmental studies	BldgRes; Geotechnical	G.H. Johnston	(613) 993-1466
GEOTECHNICS:PERMAFROST	Physical and mechanical properties of frozen ground	BldgRes; Geotechnical	T.H.W. Baker	(613) 993-1466
GEOTECHNICS:PERMAFROST	Permafrost engineering design criteria	BldgRes; Geotechnical	G.H. Johnston	(613) 993-1466
GEOTECHNICS:SNOW	Geotechnical aspects of snow mechanics	BldgRes; West	D.M. McClung	(604) 542-4829
GEOTECHNICS:SOIL MAPPING	Regional studies	BldgRes; Geotechnical	W.J. Eden	(613) 993-1466
GEOTECHNICS:SOILS	Deformation and stresses in soils	BldgRes; Geotechnical	K.T. Law	(613) 993-1466

Keyword	Description	Where work is done	Contact	Telephone
GEOTECHNICS:SOILS	Soil strength and rapid failures	BldgRes; Geotechnical	M. Bozozuk	(613) 993-1466
GEOTECHNICS:THERMAL PROPERTIES	Ground thermal regime	BldgRes; Geotechnical	L.E. Goodrich	(613) 993-1466
GEOTECHNICS:TUNNELLING	Tunnelling and underground construction	BldgRes; Geotechnical	J.H.L. Palmer	(613) 993-1466
GRAINS:UTILIZATION	Crop utilization	PlantBio; Biotechnology	R.D. Reichert	(306) 665-5269
GROUND:THERMAL PROPERTIES	Ground thermal regime	BldgRes; Geotechnical	L.E. Goodrich	(613) 993-1466
GROUND:THERMAL PROPERTIES	Frost action in soils	BldgRes; Geotechnical	E. Penner	(613) 993-1466
HEARING MEASUREMENT	Ear studies; earphone calibration; hearing measurement and conservation; noise and sleep	Physics; Acoustics	E.A.G. Shaw	(613) 993-2840
HEAT PUMP	Heat pumps	MechEng; Low Temperature	R. Ringer	(613) 993-2439
HEAT PUMPS	Component & technology development and evaluation	Energy; Heat Pumps BldgRes; Energy & Services BldgRes; Geotechnical MechEng; Low Temperature	J.R Wright J. Sasaki E. Penner T.R. Ringer	(613) 993-0922 993-1421 993-1466 993-2439
HEAT PUMPS	Residential applications, water and air sources	Energy; Heat Pumps BldgRes; Energy & Services MechEng; Low temperature	J.R. Wright J. Sasaki T.R. Ringer	(613) 993-0922 993-1421 993-2439
HEAT PUMPS	Heat transfer studies, especially as related to thermosiphons or heat pumps	MechEng; Gas Dynamics	R.A. Tyler	(613) 993-2442

Keyword	Description	Where work is done	Contact	Telephone
HEAT PUMPS:COMMERCIAL	Industrial and commercial application and heat recovery	Energy; Heat Pumps	J.R. Wright	(613) 993-0922
HEAT PUMPS:RESIDENTIAL	Identify applications for heat pumps in residential buildings	BldgRes; Thermal Performance	R.L.D. Cane	(613) 993-1421
HEAT STORAGE	Ground heat storage	BldgRes; Geotechnical	J.H.L. Palmer	(613) 993-1466
HEAT TRANSFER	Heat transfer studies, especially as related to thermosiphons or heat pumps	MechEng; Gas Dynamics	R.A. Tyler	(613) 993-2442
HEAT TRANSFER:REFRIGERATION	Thermal refrigeration and two-phase heat transfer	MechEng; Low Temperature	T.R. Ringer	(613) 993-2439
HEATING AND AIR CONDITIONING	Application, design and operation of district heating systems in Canada	BldgRes; Energy and Services	R.C. Biggs	(613) 993-9580
HEATING AND AIR CONDITIONING	Ventilation and air quality	BldgRes; Energy and Services	G.T. Tamura	(613) 993-9580
HEATING AND AIR CONDITIONING	Identify applications for heat pumps in residential buildings	BldgRes; Thermal Performance	R.L.D. Cane	(613) 993-1421
HEATING AND AIR CONDITIONING	Air infiltration in residential buildings	BldgRes; Prairie	R.S. Dumont	(306) 665-4204
HEATING AND AIR CONDITIONING	Methods for estimating air change rate and air pressure distribution of a house	BldgRes; Thermal Performance	C.Y. Shaw	(613) 993-1421
HIGH INTENSITY NOISE	Acoustic effects on aircraft and spacecraft	Aero; Structures and Materials	R. Westley	(613) 998-3408

Keyword	Description	Where work is done	Contact	Telephone
HIGH PRESSURE CHEMISTRY	Physical chemistry at high pressures	Chem; High Pressure, MRL	E. Whalley	(613) 993-2520
HIGH TEMPERATURE CHEMISTRY	Metallurgical chemistry. Ionic structure of metallurgical slags, gaseous transport in molten ores; effect of electrons on diffusion of sulfur and oxygen	Atlantic; High Temperature Chemistry	C. Masson	(902) 426-8267
HIGH VOLTAGE DC TRANSMISSION	High voltage DC research on environmental factors on transmission lines	ElecEng; Power Engineering	A.R. Morse	(613) 993-3368
HIGH VOLTAGE MEASUREMENTS	High voltage impulse measurements - devising practical standards for industry	ElecEng; Power Engineering	M.M.C. Collins	(613) 993-2660
HORMONES	Hormone structure and activity	BioSci; Molecular Biophysics Group, Sussex	I.C.P. Smith	(613) 995-7852
HOSPITAL BEDS	Hospital air bed	MechEng; Engine	H.S. Fowler	(613) 993-2425
HOT WATER SYSTEMS:DOMESTIC	Solar domestic hot water systems	Energy; Solar	R.H. Peters	(613) 993-2730
HUMAN ENGINEERING	Control and tracking characteristics of the human operator	MechEng; Systems	P.A. Hamill	(613) 993-9208
HUMAN ENGINEERING:BUILDING USE	Occupancy, use and maintenance	BldgRes; Building Performance	J.R. Champagne	(613) 993-1231
HUMAN ENGINEERING:LIGHTING	Development of lighting systems	BldgRes; Energy and Services	M.S. Rea	(613) 993-9580
HUMAN PSYCHOMOTOR PERFORMANCE	Control and tracking characteristics of the human operator	MechEng; System	P.A. Hamill	(613) 993-9208

Keyword	Description	Where work is done	Contact	Telephone
HYBRID POWER:AUTOMOTIVE	Performance analysis of advanced vehicle hybrid power systems	MechEng; Fuels and Lubricants	R.B. Whyte	(613) 993-2415
HYDRAULIC ENERGY	Hydraulic energy from waves, currents, tides	MechEng; Hydraulics	J. Ploeg	(613) 993-2417
HYDROCARBON OXIDATION	Hydrocarbon autoxidation	Chem; Kinetics & Catalysis, MRL	J.R. Morton	(613) 993-2372
HYDRODYNAMIC MODELLING	Design, development and testing of hydrodynamic equipment and instrumentation, i.e., wavemakers, beaches, flume stabilizers, etc.	Arctic; Systems	D. Gospodnetic	(613) 993-2288
HYDROGEN ENERGY	Advanced batteries	Energy/Chem; Hydrogen	M. Hammerli	(613) 993-0776
HYDROGEN ENERGY:CONVERSION	Energy conversion, storage and hydrogen	Chem; Solid State Chemistry, MRL	C.M. Hurd	(613) 993-2514
HYDROGEN ENERGY:ELECTROCHEMICAL	Fuel cells	Energy/Chem; Hydrogen	M. Hammerli	(613) 993-0776
HYDROGEN ENERGY:MECHANICAL	Engines; combustion	Energy/Chem; Hydrogen MechEng; Engine Lab	J.R.B. Murphy	(613) 993-0771
HYDROGEN ENERGY:PRODUCTION METHODS	Electrolysis; thermochemical; photocatalytic	Energy/Chem; Hydrogen	M. Hammerli	(613) 993-0776
HYDROGEN ENERGY:STORAGE	Energy conversion, storage and hydrogen	Chem; Solid State Chemistry, MRL	C.M. Hurd	(613) 993-2514
HYDROGEN ENERGY:STORAGE	Hydrides; high pressure	Energy/Chem; Hydrogen	J.E.A. Alderson	(613) 993-0770
ICE BREAKING	Air cushion technology - heavy transporters, ferries, ice breaking	MechEng; Engine	H.S. Fowler	(613) 993-2425

Keyword	Description	Where work is done	Contact	Telephone
ICE ENGINEERING	Design criteria for structures subjected to forces due to river, lake or sea ice	BldgRes; Geotechnical	R. Frederking	(613) 993-1466
ICE FORCES	Research on structures in ice	MechEng; Hydraulics	J. Ploeg	(613) 993-2417
ICEBREAKERS:DESIGN AND TESTING	Design and model and full scale performance evaluation of icebreakers and ice-transiting vessels	Arctic; Research	M. Michallidis	(613) 993-2288
ICE:PROPERTIES	Basic mechanical and strength properties of river, lake and sea ice	BldgRes; Geotechnical	N.K. Sinha	(613) 993-1466
IMMUNOCHEMISTRY	Synthetic antigens from carbohydrates	BioSci; Microbiology and Immunochemistry, Sussex	H.J. Jennings	(613) 992-5729
IMMUNOCHEMISTRY	Structure of antigenic polysaccarides	BioSci; Microbiology and Immunochemistry, Sussex	H.J. Jennings	(613) 992-5729
IMMUNOLOGY	Monoclonal antibody by hybridoma technology	BioSci; Microbiology and Immunochemistry, Sussex	D.R. Bundle	(613) 993-5291
INDOOR AIR QUALITY	Ventilation and air quality	BldgRes; Energy and Services	G.T. Tamura	(613) 993-9580
INDUSTRIAL CONTROLS	Distributed industrial process control	MechEng; Systems	P.A. Hamill	(613) 993-9208
INDUSTRIAL CONTROLS	Microprocessor application in industrial applications	MechEng; Systems	P.A. Hamill	(613) 993-9208
INDUSTRIAL MEMBRANES	Technology transfer; field testing of membrane and agglomeration technology	Chem; Chemical Engineering, MRL	C.E. Capes	(613) 993-2455

Keyword	Description	Where work is done	Contact	Telephone
INDUSTRIAL MEMBRANES	Chemical engineering	Chem; Chemical Engineering, MRL	C.E. Capes	(613) 993-2455
INDUSTRIAL NOISE	Machinery noise source identification	MechEng; Engine	H.S. Fowler	(613) 993-2425
INDUSTRIAL NOISE AND VIBRATION	Hand-arm vibration; white finger syndrome (Raynaud's Syndrome)	Physics; Acoustics	A.J. Brammer	(613) 993-2840
INDUSTRIAL ROBOTICS	Experimental computer integrated manufacturing cell	MechEng; Systems	P.A. Hamill	(613) 993-9208
INDUSTRIAL ROBOTICS:PROGRAMMING	Off-line programming of industrial robots	MechEng; Systems	P.A. Hamill	(613) 993-9208
INFORMATION DISSEMINATION	Development of information delivery systems for the health care worker	ElecEng; Medical Engineering	D. Crabtree	(613) 993-0476
INFORMATION SERVICES:BUILDING RESEARCH	Direct support of construction industry through provision of technical information services	BldgRes; Technical Information	G.P. Williams	(613) 993-2607
INFRARED SPECTRA:MOLECULES	----------	Astro; Spectroscopy, Sussex	J.W.C. Johns	(613) 992-6917
INFRARED SPECTROSCOPY:FREE RADICALS	Infrared spectroscopy of free radicals	Astro; Spectroscopy, Sussex	A.R.W. McKellar	(613) 992-6917
INFRA-RED SPECTROPHOTOMETRY	Physical and chemical instrumental analyses on the structure of organic molecules. Research directed at understanding of hydrogen bonding; use of isotope labelling, fabrication of special probes; development of analytical techniques and procedures	Atlantic; Biophysics	M. Falk	(902) 426-8265

Keyword	Description	Where work is done	Contact	Telephone
INFRA-RED THERMOMETRY:MATERIALS ANALYSIS	Materials analysis using infra-red thermometry	Indust. Mat.; Instruments and Systems Section	P. Cielo	(514) 641-2280
INSECTS:PHEROMONES	Insect sex pheromones: identification of sex pheromones; field trials, evaluations and commercial applications for specific monitoring programs	PlantBio; Chemistry	E.W. Underhill	(306) 665-5273
INSULATION:FOUNDATIONS	Effect of thermal insulation on basement heat loss	BldgRes; Prairie	D.A. Figley	(306) 665-4200
INTEGRATED MANUFACTURING	Experimental computer integrated manufacturing cell	MechEng; Systems	P.A. Hamill	(613) 993-9208
INTERFEROMETRY:OPTICAL	Ultrasound generation using laser pulses and detection by optical interferometry	Indust. Mat.: Instruments and Systems Section	J.P. Monchalin	(514) 641-2280
INTERSTELLAR MOLECULES	----------	Astro; Astronomy, Sussex	J. MacLeod	(613) 593-6060
IONOSPHERIC STUDIES	----------	Astro; Space Physics, Sussex	B.A. Whalen A.W. Yau	(613) 992-2734
IONOSPHERIC STUDIES	Ionospheric currents	Astro; Space Physics, Sussex	D.D. Wallis T.J. Hughes	(613) 992-2734
IONOSPHERIC STUDIES	Investigation of upper atmospheric and magnetospheric phenomena	SpaSci; Ottawa	G. Atkinson	(613) 992-0304
IONOSPHERIC STUDIES	Ionospheric plasmas	Astro; Planetary Sciences, Sussex	A.G. McNamara	(613) 992-6511

Keyword	Description	Where work is done	Contact	Telephone
ISOTOPE LABELLING	Physical and chemical instrumental analyses on the structure of organic molecules. Research directed at understanding of hydrogen bonding; use of isotope labelling, fabrication of special probes; development of analytical techniques and procedures	Atlantic; Physical Analyses	A. Hanson	(902) 426-8258
JOSEPHSON EFFECT	----------	Physics; Electrical and Time Standards	B.M. Wood	(613) 993-2867
KINETICS OF CHEMICAL REACTIONS	Research in basic chemical kinetics and photochemistry	Chem; Photochemistry & Kinetics, Sussex	R.A.. Back	(613) 996-3732
LASER APPLICATIONS	Laser photochemistry	Chem; Laser Chemistry, Sussex	P. Hackett	(613) 992-2024
LASER PHOTOCHEMISTRY	Laser photochemistry	Chem; Laser Chemistry, Sussex	P. Hackett	(613) 992-2024
LASER WELDING	Development and demonstration of advanced manufacturing technology	MechEng; Manufacturing Technology Centre	G. McGregor	(613) 993-2436
LASERS:STANDARDS	Frequency standards and stabilization	Physics; Mechanical and Optical	K.H. Hart	(613) 993-3326
LASERS:SURFACE TREATMENTS	Surface treatments using laser	Indust. Mat.: Coatings Section at Institut national de la recherche scientifique in Varennes	S. Dallaire	(514) 652-9836

Keyword	Description	Where work is done	Contact	Telephone
LASERS:THEORY	High power, excimer, CO_2 and picosecond lasers; laser-plasma interactions; plasma diagnostics; HV switches	Physics; Laser and Plasma Physics	A.G. Alcock	(613) 993-2777
LASERS:ULTRASOUND GENERATION	Ultrasound generation using laser pulses and detection by optical interferometry	Indust. Mat.: Instruments and Systems Section	J.P. Monchalin	(514) 641-2280
LICHENS	Research in support of agriculture: effect of fungal toxins on growth of ruminants; ecology and chemistry of lichens and sphagnum mosses; development of the ostrich fern as an agronomic crop	Atlantic; Lichenology	W. Maass	(902) 426-8286
LIGHTING:BUILDINGS	Development of lighting systems	BldgRes; Energy and Services	M.S. Rea	(613) 993-9580
LIGHTNING	High voltage impulse measurements - devising practical standards for industry	ElecEng; Power Engineering	M.M.C. Collins	(613) 993-2660
LIGNIN:DEGRADATION	Lignin degradation by fungi	PlantBio; Microbial	I.D. Reid	(306) 665-5242
LIQUID CRYSTALS	Light and colour studies and standards	Physics; Optics	G. Wyszecki	(613) 993-2504
LIQUIDS:PROPERTIES	Volumetric properties of liquids	Chem; Thermochemistry, Sussex	G.C. Benson	(613) 992-3839
LOUDSPEAKERS:TESTING	Evaluation of loudspeakers - studies of human judgment in sound quality	Physics; Acoustics	F. Toole	(613) 993-2840

Keyword	Description	Where work is done	Contact	Telephone
LUBRICANTS:TESTING	Miscellanous laboratory test work in support of other projects and general enquiries	MechEng; Fuels and Lubricants	R.B. Whyte	(613) 993-2415
MACHINE VISION	Automated inspection and handling systems	Aero; Structures and Materials	H.F.L. Pinkney	(613) 993-2450
MACHINING	Development and demonstration of advanced manufacturing technology	MechEng; Manufacturing Technology Centre	G. McGregor	(613) 993-2436
MAGNETIC LEVITATION: TRANSPORTATION	Advanced transportation concepts using magnetic levitation	MechEng; Railway	C.A.M. Smith	(613) 998-9638
MAGNETIC PROPERTIES:STEELS	Effects of mechanical stress on the magnetic properties of steels for gas/oil pipelines	Indust. Mat.: Instruments and Systems Section	J. Bussière	(514) 641-2280
MAGNETOSPHERE:PLASMA	Investigation of upper atmospheric and magnetisopheric phenomena	Spa. Science; Ottawa	G. Atkinson	(613) 992-0304
MAGNETOSPHERE:PLASMA AND CURRENTS	----------	Astro; Space Physics, Sussex	J.R. Burrows A.W. Yau	(613) 992-2734
MARINE ARCHITECTURE	Preliminary design, seakeeping and capsizing investigations	Arctic; Research	M. Michalildis	(613) 993-2288
MARINE ARCHITECTURE:DESIGN AND TESTING	Design studies, model resistance, propulsion, maneuvering, seakeeping, wake surveys, etc. for marine craft requiring special equipment and testing techniques (e.g., hydrofoils)	Arctic; Operations	D.C. Murdey	(613) 993-2288

Keyword	Description	Where work is done	Contact	Telephone
MARINE ARCHITECTURE:DESIGN AND TESTING	Preliminary design studies model resistance, propulsion, maneuvering, seakeeping, wake surveys, etc. and full scale trials for a broad range of marine craft	Arctic; Operations	D.C. Murdey	(613) 993-2288
MARINE ARCHITECTURE:DESIGN METHODS	Computer aided design and manufacture of ship hulls and propellers	Arctic; Systems	D. Gospodnetic	(613) 993-2288
MARINE ARCHITECTURE:SHIP MODELS	Preliminary design, model resistance, propulsion, maneuvering and seakeeping programs for high speed hulls	Arctic; Operations		993-2288
MARINE ARCHITECTURE: UNCONVENTIONAL VESSELS	Design studies, model resistance, propulsion, maneuvering, seakeeping, wake surveys, etc. for marine craft requiring special equipment and testing techniques (e.g., hydrofoils)	Arctic; Operations	D.C. Murdey	(613) 993-2288
MARINE ARCHITECTURE:YACHTS	Yacht design studies and performance evaluations	Arctic; Operations	D.C. Murdey	(613) 993-2288
MARINE DYNAMICS	Fundamental hydrodynamic studies in support of marine transportation research and development	Arctic; Research	M. Michailidis	(613) 993-2288
MARINE DYNAMICS:DESIGN AND TESTING	Preliminary design studies model resistance, propulsion, maneuvering, seakeeping, wake surveys, etc. and full scale trials for a broad range of marine craft	Arctic; Operations	D.C. Murdey	(613) 993-2288

Keyword	Description	Where work is done	Contact	Telephone
MARINE DYNAMICS:OCEAN PLATFORMS	Model studies of wind, wave and ice induced forces and moments on platforms, their stability and towing characteristics	Arctic; Research	M. Michallidis	(613) 993-2288
MARINE DYNAMICS:VESSELS AND STRUCTURES	Statistical analyses of ocean waves and their effect on marine vehicles and structures	Arctic; Systems	D. Gospodnetic	(613) 993-2288
MARINE ECOLOGY	Ecology, taxonomy and genetics of marine plants; isolation of biologically active compounds from marine organisms; development of aquaculture systems	Atlantic; Marine Plant Biochemistry - Marine Plant Ecology - Marine Plant Chemistry - Marine Plant Genetics	 J. Craigie J. McLachlan J. Wright J. van der Meer	(902) 426-8287 426-8274 426-8275 426-8276
MARINE PLANTS	Ecology, taxonomy and genetics of marine plants; isolation of biologically active compounds from marine organisms; development of aquaculture systems	Atlantic; Marine Plant Genetics - Marine Plant Biochemistry - Marine Plant Ecology - Marine Plant Chemistry	 J. van der Meer J. Craigie J. McLachlan J. Wright	(902) 426-8276 426-8287 426-8274 826-8275
MARINE RESEARCH:ARCTIC	Facilities and equipment design for a national facility for arctic vessel and marine research	Arctic; Systems	D. Gospodnetic	(613) 993-2288
MARINE TRANSPORTATION	Fundamental hydrodynamic studies in support of marine transportation research and development	Arctic; Research	M. Michallidis	(613) 993-2288
MARINE TRANSPORTATION:HIGH SPEED	Preliminary design, model resistance, propulsion, maneuvering and seakeeping programs for high speed hulls	Arctic; Operations	D.C. Murdey	(613) 993-2288

Keyword	Description	Where work is done	Contact	Telephone
MARINE TRANSPORTATION: SPECIAL PROBLEMS	Investigation of special marine problems and situations: restricted waterways, shallow water effects, mooring studies, aircraft ditching	Arctic; Research	M. Michallidis	(613) 993-2288
MARINE TRANSPORTATION: TOWING STUDIES	Model and full scale instrumentation and body design performance evaluations	Arctic; Systems	M. Miles	(613) 993-2288
MARINE VESSEL STABILITY	Preliminary design, seakeeping and capsizing investigations	Arctic; Research	M. Michallidis	(613) 993-2288
MASONRY	Masonry research: clay brick and concrete block masonry	BldgRes; Building Structures	A.H.P. Maurenbrecher	(613) 993-2433
MASS SPECTROMETRY	Electron-induced desorption; secondary ion mass spectroscopy	Physics; Solid State Science	P.H. Dawson	(613) 993-3919
MASS SPECTROMETRY	Quadrapole and tandam quadrupole mass spectrometry	Physics; Solid State Science	P.H. Dawson	(613) 993-3919
MASS SPECTROMETRY	Physical and chemical instrumental analyses on the structure of organic molecules. Research directed at understanding of hydrogen bonding; use of isotope labelling, fabrication of special probes; development of analytical techniques and procedures	Atlantic; Analytical Chemistry	W. Jamieson	(902) 426-8279
MATERIAL ANALYSIS: PHOTON ACTIVATION	----------	Physics; X-rays and Nuclear Radiation	W.F. Davidson	(613) 993-9352

Keyword	Description	Where work is done	Contact	Telephone
MATERIALS:LIQUID STATE	Studies of the structure of materials in the liquid state	Indust. Mat.; Rheology Section	L.A. Utracki	(514) 641-2280
MATHEMATICAL MODELLING	Mathematics modelling of coastal engineering processes	MechEng; Hydraulics	J. Ploeg	(613) 993-2417
MATHEMATICAL MODELLING: BIOMATHEMATICS	Biometric analysis	BioSci; Biomathematics, Sussex	D.R. Miller	(613) 993-6912
MATHEMATICAL MODELS	Multi-body systems dynamics	MechEng; Systems	P. Hamill	(613) 993-9208
MATHEMATICAL MODELS:POLLUTANTS	Formulation and validation of mathematical models of pollutants movement in aquatic ecosystems	BioSci; Ecotoxicology, Tunney's Pasture	D.R. Miller	(613) 993-6912
MECHANICAL EQUIPMENT:SCALING	Development of alternative smaller scale industrial mech. equipment	MechEng; West	C. Dayson	(604) 732-4477
MEMBRANES:PROPERTIES	Membrane properties and separations	Chem; Chemical Engineering, MRL	C.E. Capes	(613) 993-2455
MEMBRANES:SEMI-PERMEABLE	Membrane properties and separations	Chem; Chemical Engineering, MRL	C.E. Capes	(613) 993-2455
MESONS	----------	Physics; High Energy Physics	M.J. Losty	(613) 993-4711
METABOLISM:MICROBIAL	Microbial degradation of aromatic, alicyclic and halogenated compounds related to pesticides	PlantBio; Microbial	E.R. Blakley	(306) 665-5245

Keyword	Description	Where work is done	Contact	Telephone
METABOLITE PRODUCTION	Production and selection of mutants; metabolic production in cell cultures; production of high yielding cell culture lines for secondary metabolites	PlantBio; Plant cell	F. Constabel	(306) 665-5281
METAL FATIGUE	High temperature oligocycle fatigue of Inconel 625	Indust. Mat.; Chemical Analysis and Corrosion Section	L. Nguyen	(514) 641-2280
METAL FATIGUE	Thermomechanical fatigue studies of certain metal alloys	Indust. Mat.; Chemical Analysis and Corrosion Section	J. Masounave	(514) 641-2280
METAL SLAGS	Metallurgical chemistry. Ionic structure of metallurgical slags, gaseous transport in molten ores; effect of electrons on diffusion of sulfur and oxygen	Atlantic; High Temperature Chemistry	C. Masson	(902) 426-8267
METALLIC COATINGS:ANALYSIS	Preliminary study of copper wire coatings using LMP technology	Indust. Mat.: Instruments and Systems Section	A. Adnot	(514) 935-8513
METALLURGY	Metallurgical chemistry. Ionic structure of metallurgical slags, gaseous transport in molten ores; effect of electrons on diffusion of sulfur and oxygen	Atlantic; High Temperature Chemistry	C. Masson	(902) 426-8267
METALS:ALLOY PRODUCTION	Manufacturing and characterizing amorphous alloys obtained by a rapid solidification	Indust. Mat.; Instruments and Systems Section	H. LeHuy	(514) 641-2280
METALS:ALLOYS	Characterization of zinc-aluminum foundry alloys	Indust. Mat.: Chemical Analysis and Corrosion Section	J. Masounave	(514) 641-2280

Keyword	Description	Where work is done	Contact	Telephone
METALS:CAST	Casting partially solidified alloys	Indust. Mat. Instruments and Systems Section	H. LeHuy	(514) 641-2280
METALS:CAST	High-pressure casting of high-melting point alloys	Indust. Mat.: Chemical Analysis and Corrosion Section	G. Bégin	(514) 641-2280
METALS:CAST	Manufacturing niobium-coppertin composites using continuous casting	Indust. Mat.: Instruments and systems Section	H. Lettuy	(514) 641-2280
METALS:CORROSION	High temperature sulphidation and oxidation	Chem; Metallic Corrosion and Oxidation, MRL	M.J. Graham	(613) 993-3548
METALS:CORROSION	Corrosion	Chem; Metallic Corrosion and Oxidation, MRL	M.J. Graham	(613) 993-3548
METALS:CORROSION	Formation and structure of oxide films	Chem; Metallic Corrosion and Oxidation, MRL	M.J. Graham	(613) 993-3548
METALS:MAGNETIC PROPERTIES	Effects of mechanical stress on the magnetic properties of steels for gas/oil pipelines	Indust. Mat.: Instruments and Systems Section	J. Bussière	(514) 641-2280
METALS:NON-DESTRUCTIVE TESTING	Detecting cracks in steel balls for grinders	Indust. Mat.: Instruments and Systems Section	F. Nadeau	(514) 641-2280
METALS:PHYSICAL PROPERTIES	Physical properties of metals and alloys	Chem; Solid State Chemistry, MRL	C.M. Hurd	(613) 993-2514
METALS:SUPERCONDUCTING	Measurement of Young's modulus and internal friction in superconducting composites	Indust. Mat.: Instruments and Systems Section	H. LeHuy	(514) 641-2280
METALS:THERMOCHEMISTRY	Thermochemistry of metals	Chem; Solid State Chemistry, MRL	C.M. Hurd	(613) 993-2514

Keyword	Description	Where work is done	Contact	Telephone
METAL:PROPERTIES	Theories of transition metals	Physics; Solid State Science	A.H. MacDonald	(613) 993-9334
METAL:PROPERTIES	Electronic structure	Physics; Solid State Science	I.M. Templeton	(613) 993-9980
METAL:PROPERTIES	Transport properties	Physics; Solid State Science	M.J. Laubitz	(613) 993-1053
METAL:PROPERTIES	Deformation mechanisms and structures	Physics; Solid State Science	Z.S. Basinski	(613) 993-9773
METAL:PROPERTIES	Defect theories	Physics; Solid State Science	R. Taylor	(613) 993-9334
METEOR SIGHTINGS	----------	Astro; Planetary Sciences, Sussex	I. Halliday	(613) 996-9345
METEORS AND METEORITES	----------	Astro; Planetary Sciences, Sussex	I. Halliday	(613) 996-9345
MICROPROCESSOR APPLICATIONS	Microprocessor application in industrial applications	MechEng; Systems	P.A. Hamill	(613) 993-9208
MICROPROCESSOR DEVELOPMENT	Industrial instrumentation and microprocessors	MechEng; West	C Dayson	(604) 732-4477
MICROWAVE PLASMA TECHNOLOGY	Preliminary study of copper wire coatings using LMP technology	Indust. Mat.: Instruments and Systems Section	A. Adnot	(514) 641-2280
MICROWAVE SPECTROSCOPY	----------	Astro; Spectroscopy, Sussex	T. Amano	(613) 992-6917
MICROWAVE:FOOD PROCESSING	Sterilization of food and agricultural products by microwave	ElecEng; Electromagnetic Engineering	W. Wyslouzil	(613) 993-9214

Keyword	Description	Where work is done	Contact	Telephone
MICROWAVE:INDUSTRIAL	Microwave heating for industrial drying and microwave instruments for measuring moisture in materials	ElecEng; Electromagnetic Engineering	W. Wyslouzil	(613) 993-9214
MODELLING:SEA ICE	Study of sea ice properties, testing techniques and scale modelling	Arctic; Research	M. Michallidis	(613) 993-2288
MOIRÉ TECHNIQUES	Scoliosis screening using moiré techniques	Physics; Photogrammetry	M.C. Van Wijk	(613) 993-2505
MOISTURE IN WALLS	Performance of wood frame enclosures in a maritime climate	BldgRes; Atlantic	D.L. Scott	(902) 426-8255
MOISTURE:BUILDING MATERIALS	Developing improved methods for determining heat and moisture characteristics of materials	BldgRes; Thermal Properties	M. Bomberg	(613) 993-1421
MOLECULAR GENETICS	Synthesis, structure and conformations of nucleir acids	BioSci; Molecular Genetics, Sussex	S.A. Narang	(613) 996-3985
MOLECULAR GENETICS	Genetic control of cytoplasmic inheritance	BioSci; Molecular Genetics, Sussex	A.P. James	(613) 992-7833
MOLECULAR GENETICS	Chromosome structure and function	BioSci; Molecular Genetics, Sussex	V.L. Selgy	(613) 992-6055
MOLECULAR GENETICS:PLANT CELLS	Genetic transformation	PlantBio; Plant cell	L.E. Pelcher	(306) 665-4564
MOLECULAR GENETICS:YEASTS	Yeast genetics and morphogenesis	BioSci; Molecular Genetics, Sussex	A. Nasim	(613) 992-7086
MOLECULAR IONS: ELECTRONIC SPECTRA	----------	Astro; Spectroscopy, Sussex	H. Lew	(613) 992-0535

Keyword	Description	Where work is done	Contact	Telephone
MOLECULAR SPECTROSCOPY	Development of techniques for spectra identification (infrared, Fourier)	Chem; Molecular Spectroscopy, Sussex	H.H. Mantsch	(613) 992-4769
MOLECULAR STRUCTURE	Hormone structure and activity	BioSci; Molecular Biophysics, Sussex	I.C.P. Smith	(613) 995-7852
MOLECULAR STRUCTURES	Structure-activity relations in biological compounds as measured by NMR ESR	BioSci; Molecular Biophysics Group, Sussex	I.C.P. Smith	(613) 995-7852
MOLECULAR STRUCTURES	X-ray crystallography of natural products	BioSci; X-ray Crystallography, Sussex	F.R. Ahmed	(613) 992-2525
MOLECULAR STRUCTURE: INTER-ATOMIC FORCES	----------	Astro; Spectroscopy, Sussex	P.R. Bunker J.K.G. Watson	(613) 992-6917 992-2621
MOORING FORCES	Mooring forces on large vessels	MechEng; Hydraulics	J. Ploeg	(613) 993-2417
MUNICIPAL WASTES	Production of methane from food and municipal plant waste	BioSci; Biological Production of Fuels, Sussex	L. van den Berg	(613) 992-3310
MUONS	----------	Physics; High Energy Physics	H. Mes	(613) 993-4711
MYCOTOXINS	Research in support of agriculture: effect of fungal toxins on growth of ruminants; ecology and chemistry of lichens and sphagnum mosses; development of the Ostrich fern as an agronomic crop	Atlantic; Microbiology	A. Taylor	(902) 426-8289
NATURAL GAS	Installation of large diesel engine for natural gas conversion as fuel	MechEng; Engine	H.S. Fowler	(613) 993-2425

Keyword	Description	Where work is done	Contact	Telephone
NAVIGATIONAL AIDS	Research and development of cable fairings, navigational aids, etc.	Arctic; Research	M. Michallidis	(613) 993-2288
NEUTRON FLUX	----------	Physics: X-rays and Nuclear Radiation	K.W. Geiger	(613) 993-2197
NITROGEN FIXATION:BACTERIA	Nitrogen fixation - bacterial studies	PlantBio; Microbial	L.M. Nelson	(306) 665-5243
NITROGEN FIXATION:PLANTS	Nitrogen fixation - plant studies; physiological evaluation for crop productivity	PlantBio; Microbial	J.D. Mahon	(306) 665-5252
NOISE AND VIBRATION:BUILDINGS	In-situ and laboratory performance of building elements and materials	BldgRes; Noise and Vibration	J.D. Quirt	(613) 993-2305
NOISE AND VIBRATION:WORKING ENVIRONMENT	Response of people to sound and vibration in their environment	BldgRes; Noise and Vibration	J.S. Bradley	(613) 993-2305
NOISE:INDUSTRIAL	Machinery noise source identification	MechEng; Engine	H.S. Fowler	(613) 993-2425
NON-DESTRUCTIVE:TESTING	Detecting cracks in steel balls for grinders	Indust. Mat.: Instruments and Systems Section	F. Nadeau	(514) 641-2280
NUCLEAR MAGNETIC RESONANCE	Action of drugs on membrane structure	BioSci; Molecular Biophysics, Sussex	I.C.P. Smith	(613) 995-7852
NUCLEAR MAGNETIC RESONANCE SPECTROMETRY	Physical and chemical instrumental analyses on the structure of organic molecules. Research directed at understanding of hydrogen bonding; use of isotope labelling, fabrication of special probes; development of analytical techniques and procedures	Atlantic; Chem. of Natural Products	G. McInnes	(902) 426-8262

Keyword	Description	Where work is done	Contact	Telephone
NUCLEAR MAGNETIC RESONANCE:CARBON 13	C-13 analytical techniques using NMR	PlantBio; Microbial	J.C. MacDonald	(306) 665-5244
NUCLEAR MAGNETIC RESONANCE:POLYMERS	Nuclear magnetic resonance	Chem; High Polymer Chemistry, Sussex	S. Bywater	(613) 993-2097
NUCLEAR MAGNETIC RESONANCE:SOLIDS	NMR and dielectric properties of solids	Chem; Colloid & Clathrate Chemistry, MRL	D.W. Davidson	(613) 993-2011
NUCLEAR SPECTROSCOPY	----------	Physics: X-rays and Nuclear Radiation	K.W. Geiger	(613) 993-2197
NUCLEAR-MAGNETIC RESONANCE	Structure-activity relations in biological compounds as measured by NMR ESR	BioSci; Molecular Biophysics Group, Sussex	I.C.P. Smith	(613) 995-7852
NUMERICAL CONTROL APPLICATIONS	Low cost CAD/CAM system development for NC applications	MechEng; West	C. Dayson	(604) 732-4477
NUMERICAL CONTROL MACHINING	Development and demonstration of advanced manufacturing technology	MechEng; Manufacturing Technology Centre	G. McGregor	(613) 993-2436
OCEAN ENERGY	Hydraulic energy from waves, currents, tides	MechEng; Hydraulics	J. Ploeg	(613) 993-2417
OCEAN PLATFORMS:STABILITY	Model studies of wind, wave and ice induced forces and moments on platforms, their stability and towing characteristics	Arctic; Research	M. Michalildis	(613) 993-2288
OCEAN PLATFORM:TOWING STUDIES	Model and full scale instrumentation and body design performance evaluations	Arctic; Systems	M. Miles	(613) 993-2288

Keyword	Description	Where work is done	Contact	Telephone
OCEANOGRAPHY	Salinometers: measurement	Physics; Heat and Thermometry	K.D. Hill	(613) 993-2313
OFFSHORE GEOTECHNICS	Offshore structures	BldgRes; Geotechnical	J.M. Konrad	(613) 993-1466
OFFSHORE STRUCTURES	Wave forces on offshore structures	MechEng; Hydraulics	J. Ploeg	(613) 993-2417
OIL EXTRACTION:TAR SANDS	Tar sands	Chem; Colloid & Clathrate Chemistry, MRL	D.W. Davidson	(613) 993-2011
OILS:ANALYSIS	Evaluation of re-refined oils	MechEng; Fuels and Lubricants	R.B. Whyte	(613) 993-2415
OPTICAL ASTRONOMY:BINARY STARS	----------	Astro; Dominion Astrophysical Observatory	J.B. Hutchings	(604) 388-3909
OPTICAL ASTRONOMY:GALACTIC STRUCTURE	----------	Astro; Dominion Astrophysical Observatory	D. Crampton	(604) 388-3900
OPTICAL ASTRONOMY:LUNAR OCCULTATIONS	----------	Astro; Dominion Astrophysical Observatory	C.L. Morbey	(604) 388-0220
OPTICAL ASTRONOMY:STAR CLUSTERS	----------	Astro; Dominion Astrophysical Observatory	J.E. Hesser	(604) 388-3974
OPTICAL ASTRONOMY:STELLAR ATMOSPHERES	----------	Astro; Dominion Astrophysical Observatory	G. Hill	(604) 388-3935
OPTICAL ASTRONOMY:VARIABLE STARS	----------	Astro; Dominion Astrophysical Observatory	J.B. Hutchings	(604) 388-3909
OPTICAL INSTRUMENTS	Design and analysis; camera calibration; eye safety; electro-optical devices; holography	Physics; Optics	G. Wyszecki	(613) 993-2504

Keyword	Description	Where work is done	Contact	Telephone
OPTICS:COATINGS	----------	Physics; Mechanical and Optical	K.H. Hart	(613) 993-3326
OPTICS:FILTERS	----------	Physics; Mechanical and Optical	K.H. Hart	(613) 993-3326
ORGANIC ELECTROCHEMISTRY	Electrode reactions	Chem; Organic Chemistry, Sussex	O.E. Edwards	(613) 992-4092
OXIDE FILMS:CORROSION	Formation and structure of oxide films	Chem; Metallic Corrosion and Oxidation, MRL	M.J. Graham	(613) 993-3548
PAINT DURABILITY	Performance of clear and pigmented coatings	BldgRes; Building Materials	H.E. Ashton	(613) 993-1596
PAINT:VISCOELASTICITY	Viscoelasticity of paint for aluminum cladding	Indust. Mat.: Plastics Section	B. Fisa	(514) 641-2280
PARTICLE ACCELERATORS	Positive ion acceleration	Physics; X-rays and Nuclear Radiations	K.W. Geiger	(613) 993-2197
PARTICLE PHYSICS	Opal project	Physics; High Energy Physics	C.K. Hargrove	(613) 993-4711
PARTICLE PHYSICS:BARYONS	----------	Physics; High Energy Physics	M.J. Losty	(613) 993-4711
PARTICLE PHYSICS:BOSONS	----------	Physics; High Energy Physics	M.J. Losty	(613) 993-4711
PARTICLE PHYSICS:COLLIDING BEAMS	----------	Physics; High Energy Physics	M. Dixit	(613) 993-4711
PARTICLE PHYSICS:INTERACTIONS	Nuclei in emulsions	Physics; High Energy Physics	B. Judek	(613) 993-4711
PARTICLE PHYSICS:MESONS	----------	Physics; High Energy Physics	M.J. Losty	(613) 993-4711

Keyword	Description	Where work is done	Contact	Telephone
PARTICLE PHYSICS:MUONS	----------	Physics; High Energy Physics	H. Mes	(613) 993-4711
PARTICLE PHYSICS:PIONS	----------	Physics; High Energy Physics	H. Mes	(613) 993-4711
PARTICLE PHYSICS:TIME PROJECTION CHAMBER	----------	Physics; High Energy Physics	H. Mes	(613) 993-4711
PATHOGENIC BACTERIA	Diagnostics and vaccines from pathogenic bacteria	BioSci; Microbiology and Immunoichemistry, Sussex	M.B. Perry	(613) 992-8995
PEAT:ENERGY	Mining; inventory; processing; conversion; dewatering; environment; products; standards	Energy/Atlantic; Peat	T.E. Tibbetts	(902) 426-7532
PEAT:ENERGY	Studies on beneficiation, pyrolysis of coal and peat; use of coal-liquid slurries in utility furnaces	Atlantic; High Temperature Chemistry	S. Whiteway	(902) 426-8269
PERMAFROST	Offshore structures	BldgRes; Geotechnical	J.M. Konrad	(613) 993-1466
PERMAFROST ENGINEERING	Permafrost engineering design criteria	BldgRes; Geotechnical	G.H. Johnston	(613) 993-1466
PERMAFROST ENGINEERING	Physical and mechanical properties of frozen ground	BldgRes; Geotechnical	T.H.W. Baker	(613) 993-1466
PERMAFROST:MAPPING	Permafrost distribution and environmental studies	BldgRes; Geotechnical	G.H. Johnston	(613) 993-1466
PESTICIDES:DEGRADATION	Microbial degradation of aromatic, alicyclic and halogenated compounds related to pesticides	PlantBio; Microbial	E.R. Blakley	(306) 665-5245

Keyword	Description	Where work is done	Contact	Telephone
PETROLEUM PRODUCTS:TESTING	Development of test method standards and specifications for petroleum products and their relation with field use	MechEng; Fuels and Lubricants	R.B. Whyte	(613) 993-2415
PHARMACEUTICALS	Action of drugs on membrane structure	BioSci; Molecular Biophysics, Sussex	I.C.P. Smith	(613) 995-7852
PHARMACEUTICALS	Hormone structure and activity	BioSci; Molecular Biophysics Group, Sussex	I.C.P. Smith	(613) 995-7852
PHEROMONES	Insect sex pheromones: identification of sex pheromones; field trials, evaluations and commercial applications for specific monitoring programs	PlantBio; Chemistry	E.W. Underhill	(306) 665-5273
PHOTOCHEMISTRY	Research in basic chemical kinetics and photochemistry	Chem; Photochemistry & Kinetics, Sussex	R.A.. Back	(613) 996-3732
PHOTOCHEMISTRY: REACTIONS	Photophysics, photochemistry of transient species	Chem; Chemical Physics, Sussex	D.F. Williams	(613) 992-5614
PHOTOGRAMMETRY	Automated inspection and handling systems	Aero; Structures and Materials	H.F.L. Pinkney	(613) 993-2450
PHOTOGRAMMETRY: INSTRUMENTATION AND AUTOMATION	Block adjustment methods	Physics; Photogrammetric Research	Z. Jaksic	(613) 993-2074
PHOTOGRAMMETRY:MEDICAL DIAGNOSIS	Scoliosis screening using moiré techniques	Physics; Photogrammetry	M.C. Van Wijk	(613) 993-2505
PHOTOGRAMMETRY:METHODS AND MATERIALS	Block adjustment methods	Physics; Photogrammetric Research	Z. Jaksic	(613) 993-2074

Keyword	Description	Where work is done	Contact	Telephone
PHOTOGRAMMETRY: ORTHOPHOTO TECHNIQUES	Digital image processing processing from aerial and space sources; engineering and biomedical applications	Physics; Photogrammetric Research	Z. Jaksic	(613) 993-2074
PHOTOGRAMMETRY:STEREO TECHNIQUES	Digital image processing processing from aerial and space sources; engineering and biomedical applications	Physics; Photogrammetric Research	Z. Jaksic	(613) 993-2505
PHOTOMETRY	Light and colour studies and standards	Physics; Optics	G. Wyszecki	(613) 993-2504
PHOTON ACTIVATION	----------	Physics; X-rays and Nuclear Radiation	W.F. Davidson	(613) 993-9352
PHOTON DETECTORS	Light and colour studies and standards	Physics; Optics	G. Wyszecki	(613) 993-2504
PHOTOVOLTAICS	Inorganic semiconductors, photovoltaics	Chem; Chemical Physics, Sussex	D.F. Williams	(613) 992-5614
PHOTOVOLTAICS	Solar photovoltaics; component & technology development	Energy; Solar ElecEng; Electronics	M. Buchanan J. Domey	(613) 993-2730 993-2557
PHOTOVOLTAICS	Development of ancillary systems including control and switching for photovoltaic power systems	ElecEng; Electronics Engineering	J. Ayer	(613) 993-9278
PHYSIOLOGY: THERMOREGULATION	Environmental effects on physiological systems	BioSci; Animal Physiology	F. Depocas	(613) 993-9316
PIONS	----------	Physics; High Energy Physics	H. Mes	(613) 993-4711

Keyword	Description	Where work is done	Contact	Telephone
PLANETARY NEBULAE	----------	Astro; Dominion Radio Astrophysical Observatory	C.R. Purton	(604) 497-5321
PLANT CELL CULTURE	Protoplast fusion and somatic hybridization; differentiation and plant regeneration in somatic cells; protoplast and cell nutrition and culture techniques	PlantBio; Plant cell	K.N. Kao	(306) 665-5279
PLANT CELL CULTURE:VIRUS ELIMINATION	Freeze-preservation of cell cultures; meristem culture and virus elimination	PlantBio; Plant cell	K.K. Kartha	(306) 665-5283
PLANT CELLS:MERISTEM CULTURE	Freeze-preservation of cell cultures; meristem culture and virus elimination	PlantBio; Plant cell	K.K. Kartha	(306) 665-5283
PLANT CELLS:MOLECULAR GENETICS	Genetic transformation	PlantBio; Plant cell	L.E. Pelcher	(306) 665-4564
PLANT CELLS:MUTANTS	Production and selection of mutants; metabolic production in cell cultures; production of high yielding cell culture lines for secondary metabolites	PlantBio; Plant cell	F. Constabel	(306) 665-5281
PLANT CELLS:STRUCTURE	Ultrastructural analyses	PlantBio; Plant cell	B. Mersey	(306) 665-5277
PLANT GENETICS:MARINE	Ecology, taxonomy and genetics of marine plants; isolation of biologically active compounds from marine organisms; development of aquaculture systems	Atlantic; Marine Plant Chemistry - Marine Plant Biochemistry - Marine Plant Ecology - Marine Plant Genetics	 J. Wright J. Craigie J. McLachlan J. van der Meer	(902) 426-8275 426-8287 426-8274 426-8276

Keyword	Description	Where work is done	Contact	Telephone
PLANT PHYSIOLOGY	Biology and physiology of freshwater vascular plants	BioSci; Ecotoxicology, Tunney's Pasture	D.R. Miller	(613) 993-6912
PLANT STUDIES:NITROGEN FIXATION	Nitrogen fixation - bacterial studies	PlantBio; Microbial	L.M. Nelson	(306) 665-5243
PLANT STUDIES:NITROGEN FIXATION	Nitrogen fixation - plant studies; physiological evaluation for crop productivity	PlantBio; Microbial	J.D. Mahon	(306) 665-5252
PLASMA DEPOSITION	Plasma deposition of graduated layers	Indust. Mat.: Coatings section at Institut national de la recherche scientifique in Varennes	S. Dallaire	(514) 652-9836
PLASMA DYNAMICS	Experimental and theoretical studies in plasma dynamics	MechEng; Gas Dynamics	R.A. Tyler	(613) 993-2442
PLASMA DYNAMICS:COMPUTER SIMULATION	Numerical studies in plasma dynamics	MechEng; Gas Dynamics	R.A. Tyler	(613) 993-2442
PLASMAS:INDUSTRIAL	Fluid and plasma dynamics applied to industrial processes	MechEng; Gas Dynamics	R.A. Tyler	(613) 993-2442
PLASMAS:THEORY	High power, excimer, CO_2 and picosecond lasers; laser-plasma interactions; plasma diagnostics. HV switches	Physics; Laser and Plasma Physics	A.G. Alcock	(613) 993-2777
PLASMAS:THEORY	Theories of one- and two-compound plasmas	Physics; Solid State Science	C. Dharma-Wardana	(613) 993-9334
PLASMA-SPRAY COATING	Protective coatings for energy conversion systems	Indust. Mat.: Coatings Section at Institut national de la recherche scientifique in Varennes	S. Dallaire	(514) 652-9836

Keyword	Description	Where work is done	Contact	Telephone
PLASTICS:ADDITIVES	Adding fillers to polymers	Indust. Mat.: Plastics Section	B. Fisa	(514) 641-2280
PLASTICS:ANALYSIS	Studies of polymers containing an additive	Indust. Mat. Plastics Section	B. Favis	(514) 641-2280
PLASTICS:ANALYSIS	Design, construction and performance evaluation of a fiberglass re-inforced plastic oar	Indust. Mat.: Plastics Section	S. Goudreau	(514) 641-2280
PLASTICS:ANALYSIS	Stress measurements by x-ray diffraction in composities and plastics with metallic additives	Indust. Mat.: Instruments and Systems Section	P. Cielo	(514) 641-2280
PLASTICS:ANALYSIS	Fatigue of engineering plastics	Indust. Mat.: Plastics Section	R. Connolly	(514) 641-2280
PLASTICS:BUILDINGS	Effect of environment on plastic building materials	BldgRes; Building Materials	A. Blaga	(613) 993-1596
PLASTICS:COMBUSTION	Combustion and flame retardancy	Chem; Textile Chemistry, MRL	D.J. Carlsson	(613) 993-2268
PLASTICS:DURABILITY	Weathering factors and accelerated methods for assessing durability of organic building materials	BldgRes; Building Materials	R.S. Yamasaki	(613) 993-1596
PLASTICS:ENVIRONMENTAL PERFORMANCE	Effect of environment on plastic building materials	BldgRes; Building Materials	A. Blaga	(613) 993-1596
PLASTICS:INJECTION MOULDING	Ultra high molecular weight polyethylene pressure moulding studies	Indust. Mat.: Plastics Section	B. Sanschagrin	(514) 641-2280
PLASTICS:INJECTION MOULDING	Urethanes: foams and reaction injection moulding	Indust. Mat. Plastics Section	P. Van Gheluwe	(514) 641-2280

Keyword	Description	Where work is done	Contact	Telephone
PLASTICS:MANUFACTURING	Preliminary study of CAD/CAM applications in plastics processing	Indust. Mat.: Plastics Section	G. Salloum	(514) 641-2280
PLASTICS:PROCESSES	Modelling of resin transfer moulding of reinforced plastics	Indust. Mat.: Plastics Section	L.P. Hébert	(514) 641-2280
PLASTICS:PROPERTIES	Extrudate swelling	Indust. Mat.: Rheology Section	L.A. Utracki	(514) 641-2280
PLASTICS:PROPERTIES	Polymeric alloys; flow studies, viscoelasticity, surface properties	Indust. Mat. Rheology Section	L.A. Utracki	(514) 641-2280
PLASTICS:PROPERTIES	Effects of high molecular mass on the creep of polyethylenes	Indust. Mat. Rheology Section	M.M. Dumoulin	(514) 641-2280
PLASTICS:REINFORCED	Modelling of resin transfer moulding of reinforced plastics	Indust. Mat.: Plastics Section	L.P. Hébert	(514) 641-2280
PLASTICS:REINFORCED	Advanced design techniques for reinforced plastics	Indust. Mat. Plastics Section	S. Goudreau	(514) 641-2280
PLASTIC:ANALYSIS	Technical and economic assessment of polymers	Indust. Mat.: Plastics Section	J. Prinsen	(514) 641-2280
PLASTIC:POLYETHYLENE	Performance of polyethylene pipelines	Indust. Mat.: Plastics Section	B. Fisa	(514) 641-2280
POLLUTANT TRANSPORT	Determination of transport distribution and biological impact of trace elements and organic pollutants in rivers	BioSci; Ecotoxicology, Tunney's Pasture	D.R. Miller	(613) 593-6912
POLLUTANTS:AQUATIC	Bioaccumulation and toxicity of compounds of mercury in aquatic ecosystems	BioSci; Ecotoxicology, Tunney's Pasture	D.R. Miller	(613) 593-6912

Keyword	Description	Where work is done	Contact	Telephone
POLLUTANTS:ORGANIC	Determination of transport distribution and biological impact of trace elements and organic pollutants in rivers	BioSci; Ecotoxicology, Tunney's Pasture	D.R. Miller	(613) 593-6912
POLLUTANTS:TRACE ELEMENTS	Determination of transport distribution and biological impact of trace elements and organic pollutants in rivers	BioSci; Ecotoxicology, Tunney's Pasture	D.R. Miller	(613) 593-6912
POLLUTANTS:TRANSPORT	Formulation and validation of mathematical models of pollutants movement in aquatic ecosystems	BioSci; Ecotoxicology, Tunney's Pasture	D.R. Miller	(613) 593-6912
POLLUTION:CHEMISTRY	Pollution chemistry of trace organics in water	PlantBio; Microbial	G.P. Slater	(306) 665-5261 665-5244
POLLUTION:ORGANIC	Pollution chemistry of trace organics in water	PlantBio; Microbial	G.P. Slater	(306) 665-5261 665-5244
POLYATOMIC MOLECULES: ELECTRONIC SPECTRA	----------	Astro; Spectroscopy, Sussex	D.A. Ramsay	(613) 996-5309
POLYESTER RESINS	Styrene emission of polyester resins	Indust. Mat. Plastics Section	R. Gauvin	(514) 641-2280
POLYETHYLENE: PROPERTIES	Effects of high molecular mass on the creep of polyethylenes	Indust. Mat. Rheology Section	M.M. Dumoulin	(514) 641-2280
POLYMER CHEMISTRY	Polymer preparations	Chem; High Polymer Chemistry, MRL	S. Bywater	(613) 993-2097
POLYMER PROPERTIES	Physical properties and characterization of polymers	Chem; High Polymer Chemistry, MRL	S. Bywater	(613) 993-2097

Keyword	Description	Where work is done	Contact	Telephone
POWDER METALLURGY	Fabrication of metallic and ceramic and metal-ceramic powders using unconventional technique	Indust. Mat.: Coatings Section at Institut national de la recherche scientifique in Varennes	S. Dallaire	(514) 652-9836
POWDER METALLURGY	Production and evaluation of a wear-resistant material with cermet particles imbedded on a metallic matrix	Indust. Mat.: Coatings Section at Institut national de la recherche scientifique in Varennes	S. Dallaire	(514) 652-9836
POWDER METALLURGY	Utilization of carbon-bond magnesia refractories	Indust. Mat.: Coatings Section at Institut national de la recherche scientifique in Varennes	S. Dallaire	(514) 652-9836
POWDERS:CERAMIC-METALLIC	Fabrication of metallic and ceramic and metal-ceramic powders using unconventional technique	Indust. Mat.: Coatings Section at Institut national de la recherche scientifique in Varennes	S. Dallaire	(514) 652-9836
POWDERS:CERAMIC-METALLIC	Production and evaluation of a wear-resistant material with cermet particles imbedded on a metallic matrix	Indust. Mat.: Coatings Section at Institut national de la recherche scientifique in Varennes	S. Dallaire	(514) 652-9836
PRECIPITATION STUDIES	Study of polarization properties of precipitation using radar techniques	ElecEng; Electromagnetic Engineering	A. Hendry	(613) 993-2568
PRESSURE CALIBRATIONS	----------	Physics; Mechanical and Optical	K.H. Hart	(613) 993-3326
PROBABILITY ANALYSIS: BIOMATHEMATICS	Biometric analysis	BioSci; Biomathematics, Sussex	D.R. Miller	(613) 593-6912

Keyword	Description	Where work is done	Contact	Telephone
PROTECTIVE COATINGS	Protective coatings for energy conversion systems	Indust. Mat.: Coatings Section at Institut national de la recherche scientifique in Varennes	S. Dallaire	(514) 652-9836
PROTEINS	Biochemistry of enzymes and proteins	BioSci; Molecular Biochemistry Group, Sussex	K.R. Lynn	(613) 992-1321
PROTEINS	Raman spectroscopy of interactions between small molecules and proteins	BioSci; Molecular Biochemistry, Sussex	P.R. Carey	(613) 992-6541
PROTEIN:FIELD PEAS	Wet processing production of protein and starch from field peas	PlantBio; Biotechnology	R.T. Tyler	(306) 665-5268
PROTOPLAST FUSION	Protoplast fusion and somatic hybridization; differentiation and plant regeneration in somatic cells; protoplast and cell nutrition and culture techniques	PlantBio; Plant cell	K.N. Kao	(306) 665-5279
PULSE RADIOLYSIS	----------	Physics: X-rays and Nuclear Radiation	N.V. Klassen	(613) 993-2197
PYROLYSIS:COAL	Studies on beneficiation, pyrolysis of coal and peat; use of coal-liquid slurries in utility furnaces	Atlantic; High Temperature Chemistry	S. Whiteway	(902) 426-8269
PYROLYSIS:PEAT	Studies on beneficiation, pyrolysis of coal and peat; use of coal-liquid slurries in utility furnaces	Atlantic; High Temperature Chemistry	S. Whiteway	(902) 426-8269

Keyword	Description	Where work is done	Contact	Telephone
QUANTUM ELECTRONICS	Quantum electronics - studies of photon echoes in solids with lasers, of laser induced resonance fluorescence and of dye lasers as tools for fluorescence spectroscopy	ElecEng; Electron Physics	A. Szabo	(613) 993-1122
QUANTUM OPTICS	Energy - and charge - transfer	Chem; Theoretical Chemistry, Sussex	W. Siebrand	(613) 992-6808
RADAR SYSTEMS	Aircraft research instrumentation, avionics and sensor subsystems	Aero; Flight Research	D.F. Daw B.W. Leach	(613) 998-3313 998-3149
RADIATION CHEMISTRY	Research in basic chemical kinetics and photochemistry	Chem; Photochemistry & Kinetics, Sussex	R.A.. Back	(613) 996-3732
RADIATION PHYSICS	----------	Physics; X-rays and Nuclear Radiation	W.F. Davidson	(613) 993-9352
RADIATION TRANSPORT	----------	Physics; X-rays and Nuclear Radiation	D.W. Rogers	(613) 993-2197
RADIATION:PHOTONUCLEAR	----------	Physics; X-rays and Nuclear Radiation	W.F. Davidson	(613) 993-9352
RADIO ASTRONOMY	Canadian Long Baseline Array	Astro; Dominion Radio Astrophysical Observatory; Astronomy, Sussex	J.A. Galt N.W. Broten T. Legg	(604) 497-5321 (613) 593-6539 (613) 593-6060
RADIO ASTRONOMY	----------	Astro; Dominion Radio Astrophysical Observatory	G.H. Costain	(604) 497-5321

Keyword	Description	Where work is done	Contact	Telephone
RADIO ASTRONOMY:GALACTIC OBJECTS	----------	Astro; Dominion Radio Astrophysical Observatory	L.A. Higgs	(604) 497-5321
RADIO ASTRONOMY: GALACTIC STRUCTURE	Mapping of Milky Way Galaxy	Astro; Dominion Radio Astrophysical Observatory	R.S. Roger	(604) 497-5321
RADIO ASTRONOMY: INSTRUMENTS	Canadian Long Baseline Array	Astro; Dominion Radio Astrophysical Observatory; Astronomy, Sussex	J.A. Galt	(604) 497-5321
			N.W. Broten	(613) 593-6539
			T. Legg	(613) 593-6060
RADIO ASTRONOMY: INTERSTELLAR NEUTRAL HYDROGEN	----------	Astro; Dominion Radio Astrophysical Observatory	R.S. Roger	(604) 497-5321
RADIO ASTRONOMY: IONIZED HYDROGEN REGIONS	----------	Astro; Dominion Radio Astrophysical Observatory	P.E. Dewdney	(604) 497-5321
RADIO ASTRONOMY:PLANETARY NEBULAE	----------	Astro; Dominion Radio Astrophysical Observatory	C.R. Purton	(604) 497-5321
RADIO ASTRONOMY:RADIO STARS	----------	Astro; Astronomy, Sussex	P. Feldman	(613) 593-6060
RADIO ASTRONOMY:RECOMBINATION LINES	----------	Astro; Dominion Radio Astrophysical Observatory; Astronomy, Sussex	T. Landecker	(604) 497-5321
			L. Doherty	(613) 593-6060
RADIO ASTRONOMY:SOLAR	----------	Astro; Dominion Radio Astrophysical Observatory	L.A. Higgs	(604) 497-3321

Keyword	Description	Where work is done	Contact	Telephone
RADIO ASTRONOMY:SUPERNOVAE REMNANTS	----------	Astro; Dominion Radio Astrophysical Observatory	T. Landecker	(604) 497-5321
RADIO ASTRONOMY:VARIABLE RADIO SOURCES	----------	Astro; Astronomy, Sussex	J. MacLeod	(613) 593-6060
RADIO FREQUENCY INTERFERENCE	Development of measurement techniques and operation of facilities to study electromagnetic interference and compatibility	ElecEng; Electromagnetic Engineering	F.R. Hunt	(613) 993-9214
RADIO GALAXIES	----------	Astro; Dominion Radio Astrophysical Observatory; Astronomy, Sussex	J.A. Galt	(604) 497-5321
			N.W. Broten	(613) 593-6539
			T. Legg	(613) 593-6060
RADIO SOURCES:EXTRAGALACTIC	----------	Astro; Dominion Radio Astrophysical Observatory	G.H. Costain	(604) 497-5321
RADIO TELESCOPES	Earth Rotation Synthesis Mapping	Astro; Dominion Radio Astrophysical Observatory	P.E. Dewdney	(604) 497-5321
RADIO TELESCOPES	Canadian Long Baseline Array	Astro; Dominion Radio Astrophysical Observatory; Astronomy, Sussex	J.A. Galt	(604) 497-5321
			N.W. Broten	(613) 593-6539
			T. Legg	(613) 593-6060

Keyword	Description	Where work is done	Contact	Telephone
RADIOACTIVITY	Absorbed dose calorimetry	Physics; X-rays and Nuclear Radiation	D.W. Rogers	(613) 993-2197
RADIOACTIVITY	----------	Physics; X-Rays and Nuclear Radiations	D.C. Santry	(613) 993-2197
RADIOACTIVITY	----------	Physics: X-rays and Nuclear Radiation	K.W. Geiger	(613) 993-2197
RADIOACTIVITY: DOSIMETRY	----------	Physics: X-rays and Nuclear Radiation	D.W. Rogers	(613) 993-2197
RADIOACTIVITY: MEASUREMENT	----------	Physics: X-rays and Nuclear Radiation	K.W. Geiger	(613) 993-2197
RADIOACTIVITY:RADIATION PHYSICS	----------	Physics; X-rays and Nuclear Radiation	W.F. Davidson	(613) 993-9352
RADIOASTRONOMY: INSTRUMENTS	----------	Astro; Astronomy, Sussex	W. Blore	(613) 593-6060
RADIOASTRONOMY: INTERSTELLAR MOLECULES	----------	Astro; Astronomy, Sussex	J. MacLeod	(613) 593-6060
RADIOLYSIS:PULSE	----------	Physics: X-rays and Nuclear Radiation	N.V. Klassen	(613) 993-2197
RADIOMETRY	Light and colour studies and standards	Physics; Optics	G. Wyszecki	(613) 993-3326
RAILWAY RESEARCH	Facilities for railway research	MechEng; Railway	C.A.M. Smith	(613) 998-9638
RAILWAY RESEARCH WEAR	Fundamental laboratory investigation of the wear of rails and wheels	MechEng; West	C. Dayson	(604) 732-4477
RAILWAY RESEARCH: INSTRUMENTATION	Instrumentation and sensor development	MechEng; Railway	C.A.M. Smith	(613) 998-9638

Keyword	Description	Where work is done	Contact	Telephone
RAILWAY VEHICLES	Rail vehicle research in laboratory and road environment	MechEng; Railway	C.A.M. Smith	(613) 998-9638
RAILWAY VEHICLES	Advanced rail vehicle design and analysis	MechEng; Railway	C.A.M. Smith	(613) 998-9638
RAILWAY VEHICLES:CLIMATIC ENGINEERING	Snow ingestion by engineering equipment	MechEng; Low Temperature	T.R. Ringer	(613) 993-2439
RAILWAYS:SNOW REMOVAL	Snow removal in railway operations	MechEng; Low Temperature	T.R. Ringer	(613) 993-2439
RASTER DISPLAY TECHNOLOGY	Development of interactive graphics techniques exploiting raster technology	ElecEng; Computer Graphics	M. Wein	(613) 993-2565
RECOMBINANT DNA	Synthesis, structure and conformations of nucleir acids	BioSci; Molecular Genetics, Sussex	S.A. Narang	(613) 996-3985
RECOMBINANT DNA	Applications of recombinant DNA	BioSci; Molecular Genetics, Sussex	V.L. Seligy	(613) 992-6055
REFLECTOMETRY	Light and colour studies and standards	Physics; Optics	G. Wyszecki	(613) 993-2504
REFRACTORY COATING	Refractory coatings on graphite electrodes	Indust. Mat.: Coatings Section at institut national de la recherche scientifique in Varennes	S. Dallaire	(514) 652-9836
REFRACTORY COATING	Utilization of carbon-bond magnesia refractories	Indust. Mat.: Coatings Section at institut national de la recherche scientifique in Varennes	S. Dallaire	(514) 652-9836
REFRIGERATION:HEAT TRANSFER	Thermal refrigeration and two-phase heat transfer	MechEng; Low Temperature	T.R. Ringer	(613) 993-2439

Keyword	Description	Where work is done	Contact	Telephone
REHABILITATION TECHNOLOGY	Electronics aids for the blind and the physically handicapped	ElecEng; Medical Engineering	J.C. Swail	(613) 993-2482
REHABILITATION TECHNOLOGY	Rehabilitation Technology Unit (RTU) - modification of prototype equipment for manufacturing, evaluation of new devices in prosthetics, orthotics and technical aids	ElecEng; Rehabilitation Technology Unit, Toronto	J. Bateleaan	(416) 499-3222
RESIDENTIAL BUILDINGS:HEAT PUMPS	Identify applications for heat pumps in residential buildings	BldgRes; Thermal Performance	R.L.D. Cane	(613) 993-1421
RESIDENTIAL BUILDINGS:THERMAL PERFORMANCE	Influence of design, construction and operation on thermal performance of residential buildings	BldgRes; Thermal Performance	G.P. Mitalas	(613) 993-1421
REVERSE OSMOSIS	Membrane properties and separations	Chem; Chemical Engineering, MRL	C.E. Capes	(613) 993-2455
RE-REFINED OILS	Evaluation of re-refined oils	MechEng; Fuels and Lubricants	R.B. Whyte	(613) 993-2415
ROBOTICS	The development of control structures, software and sensor systems for robotics	ElecEng; Computer Graphics	N. Burtnyk	(613) 993-0261
ROBOTICS	Development of optical and electronic technologies in real-time with application to industrial inspection and robotics	ElecEng; Electronics Engineering	J. Domey	(613) 993-2557
ROOFING	Behaviour of flat roofing systems and components	BldgRes; Prairie	C.P. Hedlin	(306) 665-4203

Keyword	Description	Where work is done	Contact	Telephone
ROOFS:MATERIALS	Properties and performance of bituminous and polymeric roofing materials	BldgRes; Building Materials	H.O. Laaly	(613) 993-1596
ROOFS:SNOW LOADING	Snow loads on roofs	BldgRes; Building Structures	D.A. Taylor	(613) 993-2433
SALINE MATERIALS	Marine analytical chemistry reference materials; development of methods for analysis of materials with high salt concentrations	Atlantic; Analytical Chemistry	W. Jamieson	(902) 426-8279
SEA ICE PROPERTIES	Study of sea ice properties, testing techniques and scale modelling	Arctic; Research	M. Michallidis	(613) 993-2288
SEA ICE PROPERTIES	Growth, morphology, structure and physical properties of sea ice	BldgRes; Geotechnical	N.K. Sinha	(613) 993-1466
SEALANT PERFORMANCE:BUILDINGS	Properties and performance of joint materials	BldgRes; Building Materials	K.K. Karpati	(613) 993-1596
SEISMIC ENGINEERING	Seismic design of structures	BldgRes; Noise and Vibration	J.H. Rainer	(613) 993-2305
SEMICONDUCTORS:THIN FILM	Inorganic semiconductors, photovoltaics	Chem; Chemical Physics, Sussex	D.F. Williams	(613) 992-5614
SENSOR DEVELOPMENT	Instrument coordination office - operated as an NRC contact point for canadian companies regarding sensor development	ElecEng; Electronics Engineering	J. Domey	(613) 993-2557

Keyword	Description	Where work is done	Contact	Telephone
SHIPBOARD INSTRUMENTATION	Design and development of electronic equipment, laboratory and shipboard data acquisition and analysis systems and preparation of computer hardware and software	Arctic; Systems	D. Gospodnetic	(613) 993-2288
SHIPS:ARCTIC CONDITIONS	Study of ship/ice interaction. Evaluation of special hull and propulsion system designs for ice-transiting vessels and protection of their propellers in ice	Arctic; Research	M. Michallidis	(613) 993-2288
SHIPS:DESIGN METHODS	Computer aided design and manufacture of ship hulls and propellers	Arctic; Systems	D. Gospodnetic	(613) 993-2288
SHIPS' PROPELLERS	Design, modelling and full scale evaluation of propeller performance	Arctic; Research	M. Michallidis	(613) 993-2288
SILICON:BIOLOGICAL ROLE	Chemistry of silicon solutions and biological role of silicon	Atlantic; Natural Products Chemistry	G. McInnes	(902) 426-8262
SMOKE MIGRATION:BUILDINGS	Smoke control in large buildings	BldgRes; Energy and Services	G.T. Tamura	(613) 993-9580
SNOW LOADING:ROOFS	Snow loads on roofs	BldgRes; Building Structures	D.A. Taylor	(613) 993-2433
SNOW MECHANICS	Geotechnical aspects of snow mechanics	BldgRes; West	D.M. McClung	(604) 542-4829
SOIL PROPERTIES	Soil strength and rapid failures	BldgRes; Geotechnical	M. Bozozuk	(613) 993-1466
SOIL PROPERTIES	Deformation and stresses in soils	BldgRes; Geotechnical	K.T. Law	(613) 993-1466

Keyword	Description	Where work is done	Contact	Telephone
SOLAR ASTRONOMY:OPTICAL	----------	Astro; Astronomy, Sussex	V. Gaizauskas	(613) 593-6060
SOLAR ASTRONOMY:RADIO	----------	Astro; Astronomy, Sussex	M. Bell	(613) 593-6060
SOLAR ASTRONOMY:RADIO	----------	Astro; Astronomy, Sussex	M. Bell	(613) 593-6060
SOLAR COLLECTORS	Solar energy	MechEng; Low Temperature	R. Ringer	(613) 993-2439
SOLAR COLLECTORS	Durability of cover and absorber materials for solar collectors	BldgRes; Building Materials	R.S. Yamasaki	(613) 993-1596
SOLAR COLLECTORS:MATERIALS	Production of selective surfaces on aluminum solar collectors	Indust. Mat.: Coatings Section at Institut national de la recherche scientifique in Varennes	J. Blain	(514) 652-9836
SOLAR ENERGY	Solar performance analysis; monitoring; measurement; instrumentation	Energy; Solar	T. LeFeuvre	(613) 993-9224
SOLAR ENERGY	Solar passive/hybrid systems	Energy; Solar BldgRes; Energy & Services	M. Glover J.R. Sasaki	(613) 993-9224 993-1421
SOLAR ENERGY	Solar domestic hot water systems	Energy; Solar	R.H. Peters	(613) 993-2730
SOLAR ENERGY	Solar commercial/ industrial heating	Energy; Solar	T. LeFeuvre	(613) 993-9224
SOLAR ENERGY	Solar test methods and standards	Energy; Solar BldgRes; Energy & Services National Solar Test Facility (ORF)	K.G. Lund J.R. Sasaki	(613) 993-2730 993-1421

Keyword	Description	Where work is done	Contact	Telephone
SOLAR ENERGY COLLECTION	Solar industrial product development; collection; storage; controls	Energy; Solar	K.G. Lund	(613) 993-2730
SOLAR ENERGY:COLLECTORS	Production of selective surfaces on aluminum solar collectors	Indust. Mat.: Coatings Section at institut national de la recherche scientifique in Varennes	J. Blain	(514) 652-9836
SOLAR ENERGY:COLLECTORS	Durability of cover and absorber materials for solar collectors	BldgRes; Building Materials	R.S. Yamasaki	(613) 993-1596
SOLAR ENERGY:MEASUREMENT	Solar simulation; infrared spectrophotometry; solar cell calibration	Physics; Optics	G. Wzszecki	(613) 993-2504
SOLAR ENERGY:PASSIVE	Passive solar heating techniques	BldgRes; Thermal Performance	S.A. Barakat	(613) 993-1421
SOLAR ENERGY:SIMUATION	Solar simulation & analytical tools	Energy; Solar	T. LeFeuvre	(613) 993-9224
SOLAR ENERGY:STANDARDS	Development and evaluation of test methods and standards for solar heating systems and components	BldgRes; Thermal Performance	S.J. Harrison	(613) 993-1421
SOLAR POWER	Solar photovoltaics; component & technology development	Energy; Solar ElecEng; Electronics	M. Buchanan J. Domey	(613) 993-2730 993-2557
SOLAR-POLAR MISSION	Cosmic ray and solar particle instrument (COSPIN) for International Solar, Polar Mission	Astro; Space Physics, Sussex	J.D. Anglin	(613) 992-2734
SOLID STATE CHEMISTRY	Thermochemistry of metals	Chem; Solid State Chemistry, MRL	C.M. Hurd	(613) 993-2514

Keyword	Description	Where work is done	Contact	Telephone
SOLID STATE CHEMISTRY	X-ray crystallography	Chem; Solid State Chemistry, MRL	C.M. Hurd	(613) 993-2514
SOLID STATE CHEMISTRY:METALS	Physical properties of metals and alloys	Chem; Solid State Chemistry, MRL	C.M. Hurd	(613) 993-2514
SOLIDS:LIGHT SCATTERING	Light scattering	Physics; Solid State Science	R. Normandin	(613) 993-2046
SOLIDS:LIGHT SCATTERING	Structural and magnetic phase transitions	Physics; Solid State Science	D.J. Lockwood	(613) 993-2046
SOLIDS:PROPERTIES	Structural and magnetic phase transitions	Physics; Solid State Science	D.J. Lockwood	(613) 993-2046
SOMATIC CELLS	Protoplast fusion and somatic hybridization; differentiation and plant regeneration in somatic cells; protoplast and cell nutrition and culture techniques	PlantBio; Plant cell	K.N. Kao	(306) 665-5279
SPACE SCIENCE INSTRUMENTATION	Cosmic ray and solar particle instrument (COSPIN) for International Solar, Polar Mission	Astro; Space Physics, Sussex	J.D. Anglin	(613) 992-2734
SPACE SCIENCE INSTRUMENTATION	Energetic ion mass spectrometer (EIMS)	Astro; Space Physics, Sussex	B.A. Whalen	(613) 992-2734
SPACE SCIENCE INSTRUMENTATION	Rocket-borne experiments	Astro; Space Physics, Sussex	B.A. Whalen	(613) 992-2734
SPACE SCIENCE INSTRUMENTATION	Canopus; Viking; WAMDII, WISP/HF; Bars	Astro; Planetary Sciences, Sussex; Space Physics, Sussex	A.G. McNamara	(613) 992-6511
SPACE STATION	Remote manipulation in space	Aero; Teleoperator Project Office	K.H. Doetsch	(613) 993-2110 993-1702

Keyword	Description	Where work is done	Contact	Telephone
SPACE TECHNOLOGY	Remote manipulation in space	Aero; Teleoperator Project Office	K.H. Doetsch	(613) 993-2110 993-1702
SPACELAB	Energetic ion mass spectrometer (EIMS)	Astro; Space Physics, Sussex	B.A. Whalen	(613) 992-2734
SPECTROPHOTOMETRY	Light and colour studies and standards	Physics; Optics	G. Wyszecki	(613) 993-3326
SPECTRORADIOMETRY	Light and colour studies and standards	Physics; Optics	G. Wyszecki	(613) 993-3326
SPECTROSCOPY MICROWAVE	----------	Astro; Spectroscopy, Sussex	T. Amano	(613) 992-6917
SPECTROSCOPY:BARYONS	----------	Physics; High Energy Physics	M.J. Losty	(613) 993-4711
SPECTROSCOPY: BIOLOGICAL	Properties of biological materials	Chem; Molecular Spectroscopy, Sussex	H.H. Mantsch	(613) 992-4769
SPECTROSCOPY:BOSONS	----------	Physics; High Energy Physics	M.J. Losty	(613) 993-4711
SPECTROSCOPY: BREMSSTRAHLUNG	----------	Physics; X-rays and Nuclear Radiation	D.W. Rogers	(613) 993-2197
SPECTROSCOPY:DIATOMIC MOLECULES	----------	Astro; Spectroscopy, Sussex	K.P. Huber	(613) 996-0940
SPECTROSCOPY:ELECTRON PARAMAGNETIC RESONANCE	Preparation and properties of metal clusters	Chem; Kinetics & Catalysis, MRL	J.R. Morton	(613) 993-2372
SPECTROSCOPY:ELECTRON PARAMAGNETIC RESONANCE	Heterogenous Catalysis	Chem; Kinetics & Catalysis, MRL	J.R. Morton	(613) 993-2372
SPECTROSCOPY:ELECTRON SPIN RESONANCE	Preparation and properties of metal clusters	Chem; Kinetics & Catalysis, MRL	J.R. Morton	(613) 993-2372

Keyword	Description	Where work is done	Contact	Telephone
SPECTROSCOPY:ELECTRON SPIN RESONANCE	Heterogenous Catalysis	Chem; Kinetics & Catalysis, MRL	J.R. Morton	(613) 993-2372
SPECTROSCOPY:ELECTRON SPIN RESONANCE	ESR spectra and structure of free radicals	Chem; Kinetics & Catalysis, MRL	J.R. Morton	(613) 993-2372
SPECTROSCOPY:ELECTRON SPIN RESONANCE	Electron spin resonance spectroscopy	Chem; Chemical Physics, Sussex	D.F. Williams	(613) 992-5614
SPECTROSCOPY: FLUORESCENCE	Protein conformation	BioSci; Molecular Biochemistry, Sussex	A.G. Szabo	(613) 992-6541
SPECTROSCOPY:FOURIER	Development of techniques for spectra identification (Infrared, Fourier)	Chem; Molecular Spectroscopy, Sussex	H.H. Mantsch	(613) 992-4769
SPECTROSCOPY:FREE RADICALS	----------	Astro; Spectroscopy, Sussex	M. Vervloet	(613) 996-0940
SPECTROSCOPY:FREE RADICALS	----------	Astro; Spectroscopy, Sussex	D.A. Ramsay	(613) 996-5309
SPECTROSCOPY:FREE RADICALS	Infrared spectroscopy of free radicals	Astro; Spectroscopy, Sussex	A.R.W. McKellar	(613) 992-6917
SPECTROSCOPY:INFRARED	Properties of biological materials	Chem; Molecular Spectroscopy, Sussex	H.H. Mantsch	(613) 992-4769
SPECTROSCOPY:INFRARED	Development of techniques for spectra identification (Infrared, Fourier)	Chem; Molecular Spectroscopy, Sussex	H.H. Mantsch	(613) 992-4769
SPECTROSCOPY:INFRARED	----------	Astro; Spectroscopy, Sussex	J.W.C. Johns	(613) 992-6917
SPECTROSCOPY:MESONS	----------	Physics; High Energy Physics	M.J. Losty	(613) 993-4711

Keyword	Description	Where work is done	Contact	Telephone
SPECTROSCOPY:MOLECULAR	Spectroscopic techniques and fundamental applications	Chem; Molecular Spectroscopy, Sussex	H.H. Mantsch	(613) 992-4769
SPECTROSCOPY:MOLECULAR IONS	----------	Astro; Spectroscopy, Sussex	H. Lew	(613) 992-0535
SPECTROSCOPY:MOLECULAR STRUCTURE	----------	Astro; Spectroscopy, Sussex	P.R. Bunker J.K.G. Watson	(613) 992-6917 992-2621
SPECTROSCOPY:NUCLEAR	----------	Physics: X-rays and Nuclear Radiation	K.W. Geiger	(613) 993-2197
SPECTROSCOPY:POLYATOMIC MOLECULES	----------	Astro; Spectroscopy, Sussex	D.A. Ramsay	(613) 996-5309
SPECTROSCOPY:RAMAN	Spectroscopic techniques and fundamental applications	Chem; Molecular Spectroscopy, Sussex	H.H. Mantsch	(613) 992-6769
SPECTROSCOPY:RAMAN	Properties of biological materials	Chem; Molecular Spectroscopy, Sussex	H.H. Mantsch	(613) 992-4769
SPECTROSCOPY:RAMAN	Raman spectroscopy of interactions between small molecules and proteins	BioSci; Molecular Biochemistry, Sussex	P.R. Carey	(613) 992-6541
SPECTROSCOPY: THEORETICAL	Molecular physics and spectroscopy	Chem; Theoretical Chemistry, Sussex	W. Siebrand	(613) 992-6808
SPECTROSCOPY: VIBRATIONAL	Vibrational spectroscopy	Chem; High Pressure, MRL	E. Whalley	(613) 993-2520
SPECTROSCOPY: VIBRATIONAL	Spectroscopic techniques and fundamental applications	Chem; Molecular Spectroscopy, Sussex	H.H. Mantsch	(613) 992-4769

Keyword	Description	Where work is done	Contact	Telephone
SPHAGNUM MOSSES	Research in support of agriculture: effect of fungal toxins on growth of ruminants; ecology and chemistry of lichens and sphagnum mosses; development of the ostrich fern as an agronomic crop	Atlantic; Marine Plant Ecology - Lichenology - Microbiology	P. von Aderkas W. Maass A. Taylor	(902) 426-8273 426-8286 426-8289
STARCH:FIELD PEAS	Wet processing production of protein and starch from field peas	PlantBio; Biotechnology	R.T. Tyler	(306) 665-5268
STEAM:THERMODYNAMIC PROPERTIES	Extension of steam tables	Chem; High Pressure, MRL	E. Whalley	(613) 993-2520
STRESS MEASUREMENTS:PLASTICS	Stress measurements by X-ray diffraction in composities and plastics with metallic additives	Indust. Mat.: Instruments and Systems	P. Cielo	(514) 641-2280
STRUCTURAL FAILURES:BUILDINGS	Structural safety and serviceability	BldgRes; Building Structures	D.E. Allen	(613) 993-2433
STRUCTURES:FATIGUE	Reliability of predictions of the stress behaviour of structures	Indust. Mat. Chemical Analysis and Corrosion	J. Masounave	(514) 935-8513
SUBMERGED STRUCTURES: STABILITY	Model studies of wind, wave and ice induced forces and moments on platforms, their stability and towing characteristics	Arctic; Research	M. Michalilidis	(613) 993-2288
SUBMERGED STRUCTURES:TOWING STUDIES	Model and full scale instrumentation and body design performance evaluations	Arctic; Systems	M. Miles	(613) 993-2288
SUBMERSIBLES:REMOTE CONTROLLED	Offshore resource extraction systems	Aero; Teleoperator Project Office	K.H. Doetsch	(613) 993-2110 993-1702

Keyword	Description	Where work is done	Contact	Telephone
SUPERCONDUCTING METALS	Measurement of Young's modulus and internal friction in superconducting composites	Indust. Mat.: Instruments and Systems Section	H. LeHuy	(514) 641-2280
SUPERCONDUCTORS	Theories of superconductors	Physics; Solid State Science	E.W. Fenton	(613) 993-2046
SUPERNOVA REMNANTS	----------	Astro; Dominion Radio Astrophysical Observatory; Dominion Astrophysical Observatory	T. Landecker	(604) 497-5321
			S. van den Bergh	(604) 388-3924
SURFACE SCIENCE	Light scattering	Physics; Solid State Science	R. Normandin	(613) 993-2046
SURFACE SCIENCE	Electron-induced desorption; secondary ion mass spectroscopy	Physics; Solid State Science	P.H. Dawson	(613) 993-9334
SURFACE SCIENCE	Surface science - ionic entrapment and gas chemisorption on metals; molecular diffraction and auger spectroscopy	ElecEng; Electron Physics	E.V. Kornelson	(613) 993-1123
SYNTHETIC TEXTILES	Structure of polymers and composites	Chem; Textile Chemistry, MRL	D.J. Carlsson	(613) 993-2268
TAR SANDS:AGGLOMERATION	Chemical engineering	Chem; Chemical Engineering, MRL	C.E. Capes	(613) 993-2455
TAR SANDS:EXTRACTION	Tar sands	Chem; Colloid & Clathrate Chemistry, MRL	D.W. Davidson	(613) 993-2011
TAXONOMY	Bacteria culture collection and associated taxonomic studies	BioSci; Microbiology and Immunochemistry, Sussex	R.K. Latta	(613) 593-5291

Keyword	Description	Where work is done	Contact	Telephone
TAXONOMY:MARINE PLANTS	Ecology, taxonomy and genetics of marine plants; isolation of biologically active compounds from marine organisms; development of aquaculture systems	Atlantic; Marine Plant Genetics - Marine Plant Biochemistry - Marine Plant Ecology - Marine Plant Chemistry	 J. van der Meer J. Craigie J. McLachlan J. Wright	(902) 426-8276 426-8287 426-8274 826-8275
TECHNOLOGY TRANSFER:BUILDING RESEARCH	General objective program	BldgRes; Building Performance	A.H. Wilson	(613) 993-1231
TECHNOLOGY TRANSFER:CHEMICAL ENGINEERING	Technology transfer	Chem; Chemical Engineering, MRL	C.E. Capes	(613) 993-2455
TELEPHONE TIME	Telephone time	Physics; Electrical and Time Standards		(613) 745-1576
TELEPHONE TIME	CHU: time standard broadcast; telephone time response; satellite time transfer	Physics; Electrical and Time Standards	C. Costain	(613) 993-1003
TELESCOPES AND INSTRUMENTATION	----------	Astro; Dominion Astrophysical Observatory	E.H. Richardson	(604) 388-3908
TEXTILE CHEMISTRY	Combustion and flame retardancy	Chem; Textile Chemistry, MRL	D.J. Carlsson	(613) 993-2268
TEXTILE CHEMISTRY	Thermal and photodegradation and stabilization of fibres and plastics	Chem; Textile Chemistry, MRL	D.J. Carlsson	(613) 993-2268
TEXTILES CHEMISTRY	Structure of polymers and composites	Chem; Textile Chemistry, MRL	D.J. Carlsson	(613) 993-2268
TEXTILES:POLYMERS	Structure of polymers and composites	Chem; Textile Chemistry, MRL	D.J. Carlsson	(613) 993-2268
TEXTILES:RESEARCH	Development of test methods and standards	Chem; Textile Chemistry, MRL	D.J. Carlsson	(613) 993-2043

Keyword	Description	Where work is done	Contact	Telephone
THERAPEUTIC AGENTS	Synthesis of substances useful in medicine and agriculture	Chem; Organic Chemistry, Sussex	O.E. Edwards	(613) 992-4092
THERMAL PERFORMANCE:BUILDINGS	Thermal performance of full scale wall and ceiling assemblies	BldgRes; Thermal Properties Section	W.C. Brown	(613) 993-1421
THERMAL PERFORMANCE:RESIDENTIAL BUILDING	Influence of design, construction and operation on thermal performance of residential buildings	BldgRes; Thermal Performance	G.P. Mitalas	(613) 993-1421
THERMAL PERFORMANCE:WINDOWS	Thermal resistance of window glazing and window frames	BldgRes; Thermal Properties	R.P. Bowen	(613) 993-1421
THERMIONIC EMISSION	Thermionic emission - applications of thermionic electron sources which include scanning electron microscopes and electron beam writing, with particular emphasis on lanthanum hexaboride	ElecEng; Electron Physics	P.B. Sewell	(613) 993-2304
THERMOACOUSTICS	Direct measurements of ultrasound absorption using thermoacoustic and thermoemission techniques	Indust. Mat. Instruments and Systems Section	J.P. Monchalin	(514) 641-2280
THERMOCHEMISTRY: LIQUID MIXTURES	Theories of liquid mixtures	Chem; Thermochemistry, Sussex	G.C. Benson	(613) 992-3839
THERMOCHEMISTRY: LIQUIDS	Calorimetric studies	Chem; Thermochemistry, Sussex	G.C. Benson	(613) 992-3839
THERMOCHEMISTRY: LIQUIDS	Volumetric properties of liquids	Chem; Thermochemistry, Sussex	G.C. Benson	(613) 992-3839
THERMODYNAMICS:LIQUIDS	PVT properties of liquids and vapours	Chem; High Pressure, MRL	E. Whalley	(613) 993-2520

Keyword	Description	Where work is done	Contact	Telephone
THERMODYNAMICS:STEAM	PVT properties of liquids and vapours	Chem; High Pressure, MRL	E. Whalley	(613) 993-2520
THERMODYNAMICS:STEAM	Extension of steam tables	Chem; High Pressure, MRL	E. Whalley	(613) 993-2520
THERMOEMISSION	Direct measurements of ultrasound absorption using thermoacoustic and thermoemission techniques	Indust. Mat.: Instruments and Systems Section	J.P. Monchalin	(514) 641-2280
THERMOMETRY:STANDARDS	----------	Physics; Heat and Thermometry	J. Ancsin	(613) 993-2313
THERMOMETRY:STANDARDS	Temperature standards	Physics; Heat and Thermometry	R.E. Bedford	(613) 993-2313
THERMOPLASTICS	Characterization of engineering thermoplastics	Indust. Mat.: Plastics Section	R. Connelly	(514) 641-2280
THERMOREGULATION: PHYSIOLOGICAL	Environmental effects on physiological systems	BioSci; Animal Physiology	F. Depocas	(613) 993-9316
THERMOSIPHONS	Heat transfer studies, especially as related to thermosiphons or heat pumps	MechEng; Gas Dynamics	R.A. Tyler	(613) 993-2442
THERMOSPHERE	Investigation of upper atmospheric and magnetospheric phenomena	SpaSci; Ottawa	G. Atkinson	(613) 592-0304
THIN FILM SEMICONDUCTORS	Inorganic semiconductors, photovoltaics	Chem; Chemical Physics, Sussex	D.F. Williams	(613) 992-5614
TIME PROJECTION CHAMBER:PARTICLE PHYSICS	----------	Physics; High Energy Physics	H. Mes	(613) 993-4711

Keyword	Description	Where work is done	Contact	Telephone
TOWING STUDIES:MARINE VESSELS	Model and full scale instrumentation and body design performance evaluations	Arctic; Systems	M. Miles	(613) 993-2288
TOXIC FUNGI	Research in support of agriculture: effect of fungal toxins on growth of ruminants; ecology and chemistry of lichens and sphagnum mosses; development of the ostrich fern as an agronomic crop	Atlantic; Marine Plant Ecology - Lichenology - Microbiology	 P. von Aderkas W. Maass A. Taylor	(902) 426-8273 426-8286 426-8289
TOXICITY:METALS	Sub-cellular mechanisms of heavy metals' toxicity	BioSci; Ecotoxicology, Tunney's Pasture	D.R. Miller	(613) 593-6912
TRAFFIC CONTROL	Traffic control strategy	MechEng; Engine	H.S. Fowler	(613) 993-2425
TRANSPORT OF FLUIDS:HIGH PRESSURE	Extension of steam tables	Chem; High Pressure, MRL	E. Whalley	(613) 993-2520
TRANSPORTATION	Advanced transportation concepts using magnetic levitation	MechEng; Railway	C.A.M. Smith	(613) 993-9638
TRIBOLOGY	Defining wear-oriented needs and activities	Indust. Mat.: Chemical Analysis and Corrosion Section	P. Tremblay	(514) 641-2280
TRIBOLOGY	Applied friction and wear research	MechEng; West	C. Dayson	(604) 732-4477
TRIBOLOGY	Practical studies of tribological components: bearings, seals, brakes	MechEng; West	C. Dayson	(604) 732-4477
TRIBOLOGY:NEW MATERIALS	Production and evaluation of a wear-resistant material with cermet particles imbedded on a metallic matrix	Indust. Mat.: Coatings Section at Institut national de la recherche scientifique in Varennes	S. Dallaire	(514) 652-9836

Keyword	Description	Where work is done	Contact	Telephone
TUNNELLING TECHNIQUES	Tunnelling and underground construction	BldgRes; Geotechnical	J.H.L. Palmer	(613) 993-1466
ULTRA FAST IMPULSE MEASUREMENT	Development of a capability for measuring ultra fast impulses for laser applications	ElecEng; Power Engineering	A.S. Podgorski	(613) 993-2660
ULTRAHIGH VACUUM TECHNOLOGY	Instrumentation for the production and measurement of ultrahigh vacuum	ElecEng; Electron Physics	J.P. Hobson	(613) 993-9196
ULTRASOUND ANALYSIS	Ultrasonic characterization of materials	Indust. Mat.: Instruments and Systems Section	L. Piché	(514) 641-2280
ULTRASOUND ANALYSIS	Optical sensors for ultrasonic detection	Indust. Mat.: Instruments and Systems Section	P. Cielo	(514) 641-2280
ULTRASOUND GENERATION	Ultrasound generation using laser pulses and detection by optical interferometry	Indust. Mat.: Instruments and Systems Section	J.P. Monchalin	(514) 641-2280
ULTRASOUND TECHNOLOGY: MANUFACTURING	Development of ultrasonic transducer manufacturing and control technology	Indust. Mat.: Instruments and Systems Section	J. Bussière	(514) 641-2280
ULTRASOUND:HOLOGRAPHY	Holographic ultrasonic camera	Indust. Mat.: Instruments and Systems Section	P. Cielo	(514) 641-2280
ULTRASOUND:MEASUREMENT	Direct measurements of ultrasound absorption using thermoacoustic and thermoemission techniques	Indust. Mat.: Instruments and Systems Section	J.P. Monchalin	(514) 641-2280
ULTRASOUND:MEDICAL USE	Ultrasound techniques and devices for medical and clinical use	ElecEng; Medical Engineering	A. Mortimer	(613) 993-1609

Keyword	Description	Where work is done	Contact	Telephone
UNSTEADY AERODYNAMICS	Stability of aircraft	Aero; Unsteady Aerodynamics	K. Orlik-Ruckemann	(613) 993-2395
UPPER ATMOSPHERE:AIRGLOW	----------	Astro; Planetary Sciences, Sussex	R.L. Gattinger	(613) 996-9345
URETHANES	Urethanes: foams and reaction injection moulding	Indust. Mat.: Plastics Section	P. Van Gheluwe	(514) 641-2280
VACCINES	Synthetic antigens from carbohydrates	BioSci; Microbiology and Immunochemistry, Sussex	H.J. Jennings	(613) 992-5729
VACCINES	Diagnostics and vaccines from pathogenic bacteria	BioSci; Microbiology and Immunochemistry, Sussex	M.B. Perry	(613) 992-8995
VAPOUR DETECTION	Trace vapours, explosives, narcotics, UFFI gases, pesticides	Aero; Unsteady Aerodynamics	L. Ellas	(613) 993-2522
VARIABLE STARS	----------	Astro; Dominion Astrophysical Observatory	J.B. Hutchings	(604) 388-3909
VEHICLE NOISE	----------	Physics; Acoustics	T.F.W. Embleton	(613) 993-2840
VENTILATION	Ventilation and air quality	BldgRes; Energy and Services	G.T. Tamura	(613) 993-9580
VENTILATION: RESIDENTIAL	Methods for estimating air change rate and air pressure distribution of a house	BldgRes; Thermal Performance	C.Y. Shaw	(613) 993-1421
VESSELS:MOORING FORCES	Mooring forces on large vessels	MechEng; Hydraulics	J. Ploeg	(613) 993-2417

Keyword	Description	Where work is done	Contact	Telephone
VIBRATING TOOLS:MEASUREMENTS AND STANDARDS	Hand-arm vibration; white finger syndrome (Raynaud's Syndrome)	Physics; Acoustics	A.F. Brammer	(613) 993-2840
VIBRATION ANALYSIS	Vibration analysis - EHM, rotors, dynamics and balancing	MechEng; Engine	H.S. Fowler	(613) 993-2425
VIBRATION PROPERTIES:STRUCTURES	Dynamic response of structures under wind, road, traffic, etc.	BldgRes; Noise and Vibration	G. Pernica	(613) 993-2305
VISCOELASTICITY:PAINTS	Viscoelasticity of paint for aluminum cladding	Indust. Mat.: Plastics Section	B. Fisa	(514) 641-2280
VITAMIN D RESEARCH	Laser photochemistry	Chem; Laser Chemistry, Sussex	P. Hackett	(613) 992-2024
VITAMIN E RESEARCH	Chemical biology	Chem; Hydrocarbon Chemistry, Sussex	K.U. Ingold	(613) 992-3335
VON KLITZING EFFECT	----------	Physics; Electrical and Time Standards	B.M. Wood	(613) 993-1003
WALLS AND CEILINGS:THERMAL PROPERTIES	Thermal performance of full scale wall and ceiling assemblies	BldgRes; Thermal Properties	W.C. Brown	(613) 993-1421
WASTE UTILIZATION:CONCRETE	Waste and by-product utilization in concrete technology	BldgRes; Building Materials	R.F. Feldman	(613) 993-1596
WATER JETS	High pressure water jet technology	MechEng; Gas Dynamics	R.A. Tyler	(613) 993-2442
WATERHOLE	Rocket-borne experiments	Astro; Space Physics, Sussex	B.A. Whalen	(613) 992-2734
WAVE FORCES	Wave forces on offshore structures	MechEng; Hydraulics	J. Ploeg	(613) 993-2417

Keyword	Description	Where work is done	Contact	Telephone
WAVES:MECHANICS AND DYNAMICS	Basic studies of wave mechanics	MechEng; Hydraulics	J. Ploeg	(613) 993-2417
WEAR RESEARCH	Applied friction and wear research	MechEng; West	C. Dayson	(604) 732-4477
WEAR:RAILWAY	Fundamental laboratory investigation of the wear of rails and wheels	MechEng; West	C. Dayson	(604) 732-4477
WELDING	Development and demonstration of advanced manufacturing technology	MechEng; Manufacturing Technology Centre	G. McGregor	(613) 993-2436
WELDING METHODS	Installation pre-engineering of hyperbaric welding	Indust. Mat.: Chemical Analysis and Corrosion Section	G. Bégin	(514) 641-2280
WELDING:ARC	Real-time control of automatic electric-arc welding	Indust. Mat.: Chemical Analysis and Corrosion Section	G. Bégin	(514) 641-2280
WELDING:AUTOMATIC	Real-time control of automatic electric-arc welding	Indust. Mat.: Chemical Analysis and Corrosion Section	G. Bégin	(514) 641-2280
WELDING:FAILURES	Weld characterization using failure mechanics	Indust. Mat.: Chemical Analysis and Corrosion Section	J. Masounave	(514) 641-2280
WHEY:UTILIZATION	Utilization of whey	PlantBio; Biotechnology	J.D. Grootwassink	(306) 665-5285
WIND EFFECTS:BUILDINGS	Wind effects on buildings and structures	BldgRes; Building Structures	W.A. Dalgliesh	(613) 993-2433
WIND ENERGY	Analysis of wind turbines, wind energy, vertical windmills	Aero; Structures and Materials Low Speed Aerodynamics	W. Wallace R.J. Templin	(613) 993-2469 993-2423

Keyword	Description	Where work is done	Contact	Telephone
WIND ENERGY	Grid coupled wind energy conversion systems	Energy/Aero; Wind Aero; Low Speed Aerodynamics	M.S. Chappell R.J. Templin	(613) 993-3405 993-2423
WIND ENERGY:CONVERSION SYSTEMS FOR REMOTE APPLICATIONS	----------	Energy/Aero; Wind Aero; Low Speed Aerodynamics	M.S. Chappell R.J. Templin	(613) 993-3405 993-2423
WIND ENERGY:RESOURCE ASSESSMENT	----------	Energy/Aero; Wind	M.S. Chappell	(613) 993-3405
WIND ENGINEERING	Wind effects on structure	Aero; Low Speed Aerodynamics	R.L. Wardlaw	(613) 993-1156
WINDOWS:MULTIPLE GLAZING	Assessing the durability of sealed double and triple glazing units	BldgRes; Thermal Properties	R.P. Bowen	(613) 993-1421
WINDOWS:PERFORMANCE	Thermal resistance of window glazing and window frames	BldgRes; Thermal Properties	R.P. Bowen	(613) 993-1421
WOOD FRAME BUILDINGS	Performance of wood frame enclosures in a maritime climate	BldgRes; Atlantic	D.L. Scott	(902) 426-8255
WOOD PULP:ANALYSIS	Pulp analysis using acoustic resonance and diffraction	Indust. Mat.: Instruments and Systems Section	P. Cielo	(514) 641-2280
WORKING ENVIRONMENT:NOISE AND VIBRATION	Response of people to sound and vibration in their environment	BldgRes; Noise and Vibration	J.S. Bradley	(613) 993-2305
X-RAY CRYSTALLOGRAPHY	X-ray crystallography of natural products	BioSci; X-ray Crystallography, Sussex	F.R. Ahmed	(613) 992-2087
X-RAY CRYSTALLOGRAPHY	X-ray crystallography	Chem; Solid State Chemistry, MRL	Dr. C.M. Hurd	(613) 993-2514

Keyword	Description	Where work is done	Contact	Telephone
X-RAY DIFFRACTION	Physical and chemical instrumental analyses on the structure of organic molecules. Research directed at understanding of hydrogen bonding; use of isotope labelling, fabrication of special probes; development of analytical techniques and procedures	Atlantic; Physical Analyses - Biophysics - Analytical Chemistry - Analytical Chemistry - Chem. of Natural Products - Physical Analyses	 A. Hanson M. Falk W. Jamieson R. Guevremont G. McInnes P. Odense	(902) 426-8258 426-8265 426-8279 426-8280 426-8262 426-3258
X-RAY DIFFRACTION:STRESS MEASUREMENT	Stress measurements by x-ray diffraction in composities and plastics with metallic additives	Indust. Mat. Instruments and Systems Section	P. Cielo	(514) 641-2280
X-RAY EXPOSURE:STANDARDS	----------	Physics: X-rays and Nuclear Radiation	K.W. Geiger	(613) 993-2197
YACHTS:DESIGN METHODS	Yacht design studies and performance evaluations	Arctic; Operations	D.C. Murdey	(613) 993-2288

PART 2
Facilities and Services

Keyword	Description	Where work is done	Contact	Telephone
ACOUSTICAL STANDARDS	Microphone calibration - sound level measurements	Physics; Acoustics	G.K. Wong	(613) 993-2840
AEROACOUSTICS	Environmental qualification testing	Aero; Structures and Materials	R. Westley	(613) 998-3408
AERODYNAMIC TESTING	9m x 9m wind tunnel	Aero; Low Speed Aerodynamics	Y. Nishimura	(613) 998-3121
AERODYNAMICS: CALIBRATION FACILITIES	Force, deadweight, load cell, accelerometer, proving ring	Aero; Structures and Materials	G.R. Cowper	(613) 993-2794
AERODYNAMICS:DYNAMIC TESTING	Static and dynamic A/C structural test facility	Aero; Structures and Materials	D.L. Simpson	(613) 993-0899
AERODYNAMICS:FULL-SCALE FATIGUE TESTING	Static and dynamic A/C structural test facility	Aero; Structures and Materials	D.L. Simpson	(613) 993-0899
AERODYNAMICS:HIGH SPEED	1.5 x 1.5m Trisonic tunnel	Aero; High Speed Aerodynamics	L. Ohman	(613) 998-3064
AERODYNAMICS:LOW SPEED	2m x 3m wind tunnel	Aero; Low Speed Aerodynamics	J. Templin	(613) 993-2423
AERODYNAMICS:LOW SPEED	Misc. low speed wind tunnels	Aero; Low Speed Aerodynamics	J. Templin	(613) 993-2423
AERODYNAMICS:STATIC TESTING	Static and dynamic A/C structural test facility	Aero; Structures and Materials	D.L. Simpson	(613) 993-0899
AEROMAGNETICS	Remote sensing and navigation system for aircraft	Aero; Flight Research	C.D. Hardwick	(613) 998-3525
AEROSPACE TELEMETRY	Data acquisition, processing and automated control for rockets and balloons	SpaSci; Ottawa, Gimli, Churchill	R. Hendry	(613) 596-5797

Keyword	Description	Where work is done	Contact	Telephone
AEROSPACE TRACKING	Data acquisition, processing and automated control for rockets and balloons	SpaSci; Ottawa, Gimli, Churchill	R. Hendry	(613) 596-5797
AIRBORNE SIMULATOR	Flight mechanics airborne simulator	Aero; Flight Research	M. Morgan	(613) 998-3006
AIRCRAFT NAVIGATION	Remote sensing and navigation system for aircraft	Aero; Flight Research	C.D. Hardwick	(613) 998-3525
AIRCRAFT STABILITY	Flight mechanics airborne simulator	Aero; Flight Research	M. Morgan	(613) 998-3006
AIRCRAFT:BIRD IMPACT	Flight impact facility	Aero; Structures and Materials	G.R. Cowper	(613) 993-2794
ATMOSPHERIC STUDIES	Flight mechanics airborne simulator	Aero; Flight Research	M. Morgan	(613) 998-3006
ATMOSPHERIC TURBULENCE	Flight mechanics airborne simulator	Aero; Flight Research	M. Morgan	(613) 998-3006
AIR QUALITY	Flight mechanics airborne simulator	Aero; Flight Research	M. Morgan	(613) 998-3006
BALLOONING:SCIENTIFIC	Operation and maintenance of permanent and expeditionary balloon launch facilities, telemetry ground stations, tracking stations, communications	SpaSci; Ottawa, Gimli, Churchill	B. Wetter	(613) 596-5836
BALLOONING:SCIENTIFIC	Use of balloon-borne instruments including telemtry, tracking and platform pointing	SpaSci; Ottawa, Gimi, Churchill	B. Wetter	(613) 596-5836
BIOMASS:CONVERSION	Biogas; thermal chemistry industrial chemicals	BioSci; Biofuels Energy; Bioenergy Contractors	L. van den Berg W.M.L. Morisset	(613) 993-3310 993-1342

Keyword	Description	Where work is done	Contact	Telephone
BIOMASS:LIQUID FUELS	Ethanol	BioSci; Biofuels Energy; Bioenergy	L. van den Berg W.M.L. Morisset	(613) 993-3310 993-1342
BIOMASS:PRODUCTION	Biotechnology; silviculture	Energy; Bioenergy Contractors	R. Overend	(613) 993-1342
BIOMASS:STRATEGIC STUDIES	Economic feasibility; technical feasibility	Energy; Bioenergy Contractors	R. Overend	(613) 993-1342
BUILDING RESEARCH:TECHNICAL INFORMATION	----------	BldgRes; Technical Information	G.P. Williams	(613) 993-2607
CLOUD PHYSICS	Flight mechanics airborne simulator	Aero; Flight Research	M. Morgan	(613) 998-3006
ELECTRICAL STANDARDS	Alternating current; radio frequency; microwaves	Physics; Electrical and Time Standards	A.F. Dunn	(613) 993-2867
ELECTRICAL STANDARDS VON KLITZING EFFECT	----------	Physics; Electrical and Time Standards	B.M. Wood	(613) 993-2898
ELECTRICAL STANDARDS:JOSEPHSON EFFECT	----------	Physics; Electrical and Time Standards	B.M. Wood	(613) 993-2898
ENERGY STORAGE:MECHANICAL	Flywheels	Energy/Chem; Hydrogen	J.R.B. Murphy	(613) 993-0771
ENVIRONMENTAL QUALITY	Development and compilation of scientific criteria for environmental quality	BioSci; Environmental Secretariat, Sussex	I. Hoffman	(613) 996-6810
FLIGHT MECHANICS	Flight mechanics airborne simulator	Aero; Flight Research	M. Morgan	(613) 998-3006
FLIGHT RECORDER PLAYBACK CENTRE	Flight data analysis, aircraft accidents, aircraft incidents	Aero; Flight Research	B. Caiger	(613) 998-3149

Keyword	Description	Where work is done	Contact	Telephone
FUSION:INERTIAL	Inertial confinement; laser fusion	Energy; Fusion Physics; Laser & Plasma	T.S. Brown	(613) 993-0810
FUSION:MAGNETIC	Magnetic confinement; Tokamak	Energy: Fusion	T.S. Brown	(613) 993-0810
FUSION:MATERIALS & ENGINEERING	Fusion fuels; Tritium	Energy; Fusion	T.S. Brown	(613) 993-0810
HEAT PUMPS	Residential applications, water and air sources	Energy; Heat Pumps BldgRes; Energy & Services MechEng; Low temperature	 J.R. Wright J. Sasaki T.R. Ringer	(613) 993-0922 993-1421 993-2439
HEAT PUMPS	Component & technology development and evaluation	Energy; Heat Pumps BldgRes; Energy & Services BldgRes; Geotechnical MechEng; Low Temperature	 J.R Wright J. Sasaki E. Penner T.R. Ringer	(613) 993-0922 993-1421 993-1466 993-2439
HEAT PUMPS:COMMERCIAL	Industrial and commercial application and heat recovery	Energy; Heat Pumps	J.R. Wright	(613) 993-0922
HEURE:ANNONCE TELEPHONIQUE	Annonce en français	----------	----------	(613) 745-9426
HOT WATER SYSTEMS:DOMESTIC	Solar domestic hot water systems	Energy; Solar	R.H. Peters	(613) 993-2730
HYDROGEN ENERGY	Advanced batteries	Energy/Chem; Hydrogen	M. Hammerli	(613) 993-0776
HYDROGEN ENERGY:ELECTROCHEMICAL	Fuel cells	Energy/Chem; Hydrogen	M. Hammerli	(613) 993-0776
HYDROGEN ENERGY:MECHANICAL	Engines; combustion	Energy/Chem; Hydrogen MechEng; Engine Lab	J.R.B. Murphy	(613) 993-0771

Keyword	Description	Where work is done	Contact	Telephone
HYDROGEN ENERGY:PRODUCTION METHODS	Electrolysis; thermochemical; photocatalytic	Energy/Chem; Hydrogen	M. Hammerli	(613) 993-0776
HYDROGEN ENERGY:STORAGE	Hydrides; high pressure	Energy/Chem; Hydrogen	J.E.A. Alderson	(613) 993-0770
INDUSTRIAL PROGRAMS:FIELD ADVISORY SERVICE	Field advisory service, technical advice, industrial engineering, assistance to government programs	IRAP-C Program Office, Ottawa	IRAP-C,-H,-L Element Manager R. Paquin	(613) 993-3431
INDUSTRIAL PROGRAMS:FINANCIAL ASSISTANCE	Assistance to small companies for industrial R&D projects	IRAP-M Program Office, Ottawa	IRAP-M Element Manager: G. Fraser IRAP-M Proj.Mgrs A.A. DeLuca J. Bradshaw E. Bellem K. Bell	(613) 993-0331
INDUSTRIAL PROGRAMS:FINANCIAL ASSISTANCE	Assistance in major industrial R&D projects	IRAP-P Program Office, Ottawa	J.H. Braams Gen. Mgr. IRAP IRAP-P Element Manager: D. Cooper IRAP-P Proj.Mgrs E. Bellem K. Bell J. Bradshaw A. DeLuca	(613) 993-2012 (613) 993-0331
INDUSTRIAL PROGRAMS:GOVERNMENT RESEARCH	Assistance in commercializing federal technology and know-how.	PILP Office, Ottawa	J.R. Vose, Gen. Mgr. PILP Project Mgrs. Phys. Sci. J. Robar Elect. Eng. B. Evans Biotech. Eng. A. Hunter G. Dupont D. Laurie-Lean	(613) 993-1790 (613) 993-0357

Keyword	Description	Where work is done	Contact	Telephone
INDUSTRIAL PROGRAMS: INCUBATOR PROGRAM	Long term cooperation with high technology companies wishing to conduct major development projects	PILP Office, Ottawa	Art Hunter	(613) 993-0357
INDUSTRIAL PROGRAMS:IRAP-C INDUSTRIAL PROGRAMS:IRAP-F	Field advisory service; technical advise; industrial engineering; assistance to Government Programs	IRAP-C Program Office, Ottawa	IRAP-C,-H,-L Element Manager R. Paquin	(613) 993-3431
INDUSTRIAL PROGRAMS:IRAP-H	Technical information service Response to technical enquiries from industry	IRAP-F Program Office, Ottawa	IRAP-F Element Manager: D. Cox	(613) 993-1753
INDUSTRIAL PROGRAMS:IRAP-L	Assistance to small business employing science or engineering undergraduates for technical projects	IRAP-H Program Office, Ottawa	IRAP-C,-H,-L Element Manager R. Paquin	(613) 993-3431
	Assistance to small business for brief laboratory investigations	IRAP-L Program Office, Ottawa	IRAP-C,-H,-L Element Manager R. Paquin	(613) 993-3431
INDUSTRIAL PROGRAMS:IRAP-M (SMALL PROJECTS)	Assistance to small companies for industrial R&D projects	IRAP-M Program Office, Ottawa	IRAP-M Element Manager: G. Fraser IRAP-M Proj.Mgrs A.A. DeLuca J. Bradshaw E. Bellem K. Bell	(613) 993-0331
INDUSTRIAL PROGRAMS:IRAP-P (MAJOR PROJECTS)	Assistance in major industrial R&D projects	IRAP-P Program Office, Ottawa	J.H. Braams Gen. Mgr. IRAP IRAP-P Element Manager: D. Cooper IRAP-P Proj.Mgrs E. Bellem K. Bell J. Bradshaw A. DeLuca	(613) 993-2012 (613) 993-0331

Keyword	Description	Where work is done	Contact	Telephone
INDUSTRIAL PROGRAMS:LABORATORY USE	Assistance to small business for brief laboratory investigations	IRAP-L Program Office, Ottawa	IRAP-C,-H,-L Element Manager R. Paquin	(613) 993-3431
INDUSTRIAL PROGRAMS:PILP	Assistance in commercializing federal technology and know-how.	PILP Office, Ottawa	J.R. Vose, Gen. Mgr. PILP Project Mgrs Phys. Sci. J. Robar Elect. Eng. B. Evans Biotech. Eng. A. Hunter G. Dupont D. Laurie-Lean	(613) 993-1790 (613) 993-0357
INDUSTRIAL PROGRAMS:POLICY ANALYSIS	- Industrial policy analysis - Industrial program review - Industrial association coordination	IPA Office, Ottawa	S.S. Grimley Gen. Mgr., IPA Project Mgrs B.G. Cameron J.E. Fisher	(613) 993-2002 (613) 993-3899 993-1090
INDUSTRIAL PROGRAMS:REGIONAL CONTACTS	Regional IRAP Offices	St. John's (NRC)	G. Cross	(709) 754-1937
	NLDC - Newfoundland and Labrador Development Corporation	St. John's (NLDC)	R. Comerford	(709) 753-3560
	NBRPC - New Brunswick Research and Productivity Council	Fredericton (NBRPC)	R. Reid	(506) 455-8994
	NSRF - Nova Scotia Research Foundation Corporation	Dartmouth (NSRF)	J. Helliwell	(902) 424-8670
	ORF - Ontario Research Foundation	Sydney (NSRF)	D. Martel	(902) 564-5484 x 21
	MRC - Manitoba Research Council	Quebec City (NRC)	J. Falardeau	(418) 694-3419
	SRC - Saskatchewan Research Council	Montreal (NRC)	C. Brousseau	(514) 482-0651
	ARC - Alberta Research Council	Ottawa (NRC)	J. McCorquodale	(613) 993-3995
	BCR - British Columbia Research	Kingston (NRC)	----------	(613) 544-1537
		Toronto (NRC)	T. Torlan	(416) 966-5845
		Toronto (ORF)	G. Sobering	(416) 822-4111 x 231

(...continued)

Keyword	Description	Where work is done	Contact	Telephone
		London (NRC)	R.S. Carrigan	(519) 434-4314
		Sudbury (NRC)	J. Bardswich	(705) 674-0471
		Winnipeg (NRC)	G. Saunders	(204) 255-9610
		Portage La Prairie (MRC)	D. Fletcher	(204) 857-7861
		Saskatoon (SRC)	B. Zuk	(306) 664-5400
		Edmonton (ARC)	J.A. Holub	(403) 438-0666
		Lethbridge (ARC)	A. Opel	(403) 329-5414
		Calgary (ARC)	C. Harrison	(403) 282-9136
		Vancouver (BCR)	D. Mullan	(604) 224-4331
INDUSTRIAL PROGRAMS:RESEARCH AND ASSISTANCE	Assistance to small companies for industrial R&D projects	IRAP-M Program Office, Ottawa	IRAP-M Element Manager: G. Fraser IRAP-M Project Managers: A.A. DeLuca J. Bradshaw E. Bellem K. Bell	(613) 993-0331
INDUSTRIAL PROGRAMS:RESEARCH ASSISTANCE	Assistance in major industrial R&D projects	IRAP-P Program Office, Ottawa	J.H. Braams General Manager IRAP	(613) 993-2012
			IRAP-P Element Manager: D. Cooper IRAP-P Project Managers: E. Bellem K. Bell J. Bradshaw A. DeLuca	(613) 993-0331

Keyword	Description	Where work is done	Contact	Telephone
INDUSTRIAL PROGRAMS:SMALL BUSINESS	Assistance to small business for brief laboratory investigations	IRAP-L Program Office, Ottawa	IRAP-C,-H,-L Element Manager R. Paquin	(613) 993-3431
INDUSTRIAL PROGRAMS:SMALL BUSINESS	Assistance to small business employing science or engineering undergraduates for technical projects	IRAP-H Program Office, Ottawa	IRAP-C,-H,-L Element Manager R. Paquin	(613) 993-3431
INDUSTRIAL PROGRAMS:STUDENT EMPLOYMENT	Assistance to small business employing science or engineering undergraduates for technical projects	IRAP-H Program Office, Ottawa	IRAP-C,-H,-L Element Manager R. Paquin	(613) 993-3431
INDUSTRIAL PROGRAMS:TECHNICAL INFORMATION	Technical information service Response to technical enquiries from industry	IRAP-F Program Office, Ottawa	IRAP-F Element Manager: D. Cox	(613) 993-1753
INTENSE NOISE FACILITY	High intensity noise simulation	Aero; Structures and Materials	R. Westley	(613) 998-3408
JOSEPHSON EFFECT	----------	Physics; Electrical and Time Standards	B.M. Wood	(613) 993-2898
LASERS:STANDARDS	Frequency standards and stabilization	Physics; Mechanical and Optical	K.H. Hart	(613) 993-3326
LENGTH STANDARDS	----------	Physics; Mechanical and Optical Physics	K.H. Hart	(613) 993-3326
MACHINING AND MANUFACTURING	Development of advanced machining and manufacturing technology	MechEng; Manufacturing Technology Centre	G. McGregor	(613) 993-2436
MARINE ARCHITECTURE	Preliminary design, seakeeping and capsizing investigations	Arctic; Research	M. Michailidis	(613) 993-2288

Keyword	Description	Where work is done	Contact	Telephone
MARINE ARCHITECTURE:DESIGN AND TESTING	Preliminary design studies model resistance, propulsion, maneuvering, seakeeping, wake surveys, etc. and full scale trials for a broad range of marine craft	Arctic; Operations	D.C. Murdey	(613) 993-2288
MARINE DYNAMICS:DESIGN AND TESTING	Preliminary design studies model resistance, propulsion, maneuvering, seakeeping, wake surveys, etc. and full scale trials for a broad range of marine craft	Arctic; Operations	D.C. Murdey	(613) 993-2288
MARINE TRANSPORTATION:TOWING STUDIES	Model and full scale instrumentation and body design performance evaluations	Arctic; Systems	M. Miles	(613) 993-2288
MASS STANDARDS	----------	Physics; Mechanical and Optical Physics	K.H. Hart	(613) 993-3326
OPTICAL TELESCOPE	----------	Ottawa River Solar Observatory	V. Galzanskas	(613) 593-6060
OPTICAL TELESCOPE	----------	Dominion Astrophysical Observatory, Victoria, B.C.	S. van den Bergh	(604) 388-3924
PEAT:ENERGY	Mining; inventory; processing; conversion; dewatering; environment; products; standards	Energy/Atlantic; Peat	T.E. Tibbetts	(902) 426-7532
PHOTOVOLTAICS	Solar photovoltaics; component & technology development	Energy; Solar ElecEng; Electronics	M. Buchanan J. Domey	(613) 993-2730 993-2557
RADIOTELESCOPES	----------	Algonquin Radio Observatory, Lake Traverse, Ontario	N.W. Broten	(613) 593-6539

Keyword	Description	Where work is done	Contact	Telephone
RADIOTELESCOPES	----------	Dominion Radio Astrophysical Observatory, Penticton, B.C.	L.A. Higgs	(604) 497-5321
RAILWAY RESEARCH	Facilities for railway research	MechEng; Railway	C.A.M. Smith	(613) 998-9638
REMOTE SENSING	Remote sensing and navigation system for aircraft	Aero; Flight Research	C.D. Hardwick	(613) 998-3525
ROCKET ENGINEERING	Implementation of new techniques in rocketry: attitude control, telemetry and recovery systems	SpaSci; Ottawa, Gimli, Churchill	R. Hendry	(613) 596-5797
ROCKET GUIDANCE	Implementation of new techniques in rocketry: attitude control, telemetry and recovery systems	SpaSci; Ottawa, Gimli, Churchill	R. Hendry	(613) 596-5797
ROCKETS:GROUND FACILITIES	Operation and maintenance of rockets, permanent and expeditionary launch facilities, telemetry and tracking ground stations, communications	SpaSci; Ottawa, Gimli, Churchill	B. Wetter	(613) 596-5836
SCIENTIFIC AND TECHNICAL INFORMATION:DATABASES	Scientific/numeric databases (CAN/SDI)	CISTI	G. Wood	(613) 993-3294
SCIENTIFIC AND TECHNICAL INFORMATION:DOCUMENT DELIVERY	----------	CISTI; Document Delivery	J. MacGregor	(613) 993-1585
SCIENTIFIC AND TECHNICAL INFORMATION:HEALTH	----------	CISTI; Health Sciences Resource Centre	M. Schafer	(613) 993-1604

Keyword	Description	Where work is done	Contact	Telephone
SCIENTIFIC AND TECHNICAL INFORMATION: INTERLIBRARY LOANS	----------	CISTI; Document Delivery	J. Kabriel	(613) 993-1513
SCIENTIFIC AND TECHNICAL INFORMATION:LITERATURE SEARCHING	----------	CISTI; Reference	M. VanBusklrk	(613) 993-2013
SCIENTIFIC AND TECHNICAL INFORMATION:MEDICAL	----------	CISTI; Health Sciences Resource Centre	M. Schafer	(613) 993-1604
SCIENTIFIC AND TECHNICAL INFORMATION:REFERENCE SERVICES	----------	CISTI; Reference	M. VanBusklrk	(613) 993-2013
SCIENTIFIC AND TECHNICAL INFORMATION:REFERRALS	----------	CISTI; Reference	M. VanBusklrk	(613) 993-2085
SCIENTIFIC AND TECHNICAL INFORMATION:SUBSCRIBER SERVICES	Online enquiry (CAN/OLE)	CISTI	B. Bullock	(613) 993-1210
SCIENTIFIC AND TECHNICAL INFORMATION:SUBSCRIBER SERVICES	Selective dissemination of information (CAN/SDI)	CISTI	B. Bullock	(613) 993-1210
SCIENTIFIC AND TECHNICAL INFORMATION:TRANSLATED	----------	Index Translation	M. Samson	(613) 993-3372
SCIENTIFIC BALLOONING	Use of balloon-borne instruments including telemtry, tracking and platform pointing.	SpaSci; Ottawa, Gimli, Churchill	B. Wetter	(613) 596-5836
SCIENTIFIC BALLOONING	Operation and maintenance of permanent and expeditionary balloon launch facilities, telemetry ground stations, tracking stations, communications	SpaSci; Ottawa, Gimli, Churchill	B. Wetter	(613) 596-5836

Keyword	Description	Where work is done	Contact	Telephone
SOLAR ENERGY	Solar passive/hybrid systems	Energy; Solar BldgRes; Energy & Services	M. Glover J.R. Sasaki	(613) 993-9224 993-1421
SOLAR ENERGY	Solar performance analysis; monitoring; measurement; instrumentation	Energy; Solar	T. LeFeuvre	(613) 993-9224
SOLAR ENERGY	Solar test methods and standards	Energy; Solar BldgRes; Energy & Services National Solar Test Facility (ORF)	K.G. Lund J.R. Sasaki	(613) 993-2730 993-1421
SOLAR ENERGY	Solar commercial/ industrial heating	Energy; Solar	T. LeFeuvre	(613) 993-9224
SOLAR ENERGY COLLECTION	Solar industrial product development; collection; storage; controls	Energy; Solar	K.G. Lund	(613) 993-2730
SOLAR ENERGY	Solar domestic hot water systems	Energy; Solar	R.H. Peters	(613) 993-2730
SOLAR ENERGY:SIMUATION	Solar simulation & analytical tools	Energy; Solar	T. LeFeuvre	(613) 993-9224
SOLAR POWER	Solar photovoltaics; component & technology development	Energy; Solar ElecEng; Electronics	M. Buchanan J. Domey	(613) 993-2730 993-2557
SPACE PLATFORM:ORIENTATION CONTROL	Implementation of new techniques in rocketry: attitude control, telemetry and recovery systems	SpaSci; Ottawa, Gimli, Churchill	R. Hendry	(613) 596-5797
SPACE SCIENCE:INSTRUMENTATION	Project management and procurement of scientific instrumentation for spacecraft and groundbased applications	SpaSci; Ottawa	R. Gruno	(613) 592-0872

Keyword	Description	Where work is done	Contact	Telephone
SPACE SCIENCE:PROGRAMS	Planning of space science activities for national and international programs	SpaSci; Ottawa	G. Atkinson	(613) 592-0304
SUB-SONIC WIND TUNNEL	1.5 x 1.5m Trisonic tunnel	Aero; High Speed Aerodynamics	L. Ohman	(613) 998-3064
TECHNICAL INFORMATION:INDUSTRIAL	Technical information service Response to technical enquiries from industry	IRAP-F Program Office, Ottawa	IRAP-F Element Manager: D. Cox	(613) 993-1753
TECHNOLOGY TRANSFER	Assistance in commercializing federal technology	PILP Office, Ottawa	J.R. Vose, General Manager, PILP Project Managers: Phys. Sci. J. Robar Elect. Eng. B. Evans Biotechnology Engineering A. Hunter G. Dupont D. Laurie-Lean	(613) 993-1790 (613) 993-0357
TELEPHONE TIME	Telephone time	Physics; Electrical and Time Standards		(613) 745-1576
TELEPHONE TIME	CHU: time standard broadcast; telephone time response; satellite time transfer	Physics; Electrical and Time Standards	C. Costain	(613) 993-1003
TIME ANNOUNCEMENT:TELEPHONE	English announcement	----------	----------	(613) 745-1576
TIME STANDARDS	CHU: time standard broadcast; telephone time response; satellite time transfer	Physics; Electrical and Time	C. Costain	(613) 993-1003

Keyword	Description	Where work is done	Contact	Telephone
UPPER ATMOSPHERE RESEARCH	Operation and maintenance of permanent and expeditionary balloon launch facilities, telemetry ground stations, tracking stations, communications	SpaSci; Ottawa, Gimli, Churchill	B. Wetter	(613) 596-5836
UPPER ATMOSPHERE RESEARCH	Implementation of new techniques in rocketry: attitude control, telemetry and recovery systems	SpaSci; Ottawa, Gimli, Churchill	R. Hendry	(613) 596-5797
UPPER ATMOSPHERIC RESEARCH	Use of balloon-borne instruments including telemtry, tracking and platform pointing.	SpaSci; Ottawa, Gimi, Churchill	B. Wetter	(613) 596-5836
VON KLITZING EFFECT	----------	Physics; Electrical and Time Standards	B.M. Wood	(613) 993-1003
WIND ENERGY	Grid coupled wind energy conversion systems	Energy/Aero; Wind Aero; Low Speed Aerodynamics	M.S. Chappell R.J. Templin	(613) 993-3405 993-2423
WIND ENERGY:CONVERSION SYSTEMS FOR REMOTE APPLICATIONS	----------	Energy/Aero; Wind Aero; Low Speed Aerodynamics	M.S. Chappell R.J. Templin	(613) 993-3405 993-2423
WIND ENERGY:RESOURCE ASSESSMENT	----------	Energy/Aero; Wind	M.S. Chappell	(613) 993-3405
WIND TUNNEL:LOW SPEED	2m x 3m wind tunnel	Aero; Low Speed Aerodynamics	J. Templin	(613) 993-2423
WIND TUNNEL:LOW SPEED	9m x 9m wind tunnel	Aero; Low Speed Aerodynamics	Y. Nishimura	(613) 998-3121
WIND TUNNEL:LOW SPEED	Misc. low speed wind tunnels	Aero; Low Speed Aerodynamics	J. Templin	(613) 993-2423

Keyword	Description	Where work is done	Contact	Telephone
WIND TUNNEL:SUPERSONIC	1.5 x 1.5m Trisonic tunnel	Aero; High Speed Aerodynamics	L. Ohman	(613) 998-3064
WIND TUNNEL:TRANSONIC	1.5 x 1.5m Trisonic tunnel	Aero; High Speed Aerodynamics	L. Ohman	(613) 998-3064
WIND TUNNEL:V/STOL	9m x 9m wind tunnel	Aero; Low Speed Aerodynamics	Nishimura	(613) 998-3121

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